PACKAGE engineering

What it takes to package fresh fruit

Drawing on the know-how and know-why of food science as a basis for understanding and solving problems inherent in keeping (through effective packaging) fruit in as nearly as possible its original condition. (See Page 37)

Using a central packaging department

Helpful experience in pulling scattered packaging people and operations into a single department and backing it up by using "reserve operators" (experienced part-time workers) to meet peak production loads. (See Page 44)

Redesign eliminates damage in transit

Tracking down causes of invisible damage to heavy (but fragile) roll stock led to redesigned interior packaging holding rolls intact but with small air spaces around rolls to protect against shock. (See Page 56)

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DECEMBER 1960

VOLUME 5 • NUMBER 12

For your calendar

January 22-25. Canning Machinery and Supplies Association 54th Annual Exhibit:
Conrad Hilton Hotel, Chicago, Ill. Contact: W. D. Lewis, Secretary-Treasurer, Canning Machinery & Supplies Association, 4630 Montgomery Ave., Washington 14, D.C. *Telephone: OLiver 6-6979.*

January 23-25. National Canners Association 54th Annual Convention:
Conrad Hilton Hotel, Chicago, Ill. Contact: R. F. Alexander, National Canners Association, 1133 20th St., N.W., Washington 6, D.C. *Telephone: FEderal 8-2030.*

February 9-10. University of Wisconsin Engineering Institute on packaging industrial products:
Wisconsin Center Building, Madison, Wis. Contact: Richard A. McCormick, institute coordinator, department of engineering, University of Wisconsin, Madison, Wis. *Telephone: ALpine 5-3311, Ext. 2815.*

February 13-17. AMA packaging management course:
Hotel Astor, New York, N.Y. Contact: John L. Wood, packaging coordinator, American Management Association, 1515 Broadway, New York 36, N.Y. *Telephone: JUdson 6-8100.*

April 4-6. Research and Development Associates 15th Annual Meeting:
Hotel John Marshall, Richmond, Va. Contact: Col. R. A. Isker, secretary, Research and Development Associates, Food and Container Institute, Inc., 1819 W. Pershing Rd., Chicago 9, Ill. *Telephone: LAfayette 3-5500, Ext. 4262 or 4267.*

April 10-12. 30th AMA National Packaging Conference:
McCormick Place (new Lakefront Exposition Center), Chicago, Ill. Contact: John L. Wood, American Management Association, 1515 Broadway, New York 36, N.Y. *Telephone: JUdson 6-8100.*

April 10-13. 30th AMA National Packaging Exposition:
McCormick Place (new Lakefront Exposition Center), Chicago, Ill. Contact: John L. Wood, American Management Association, 1515 Broadway, New York 36, N.Y. *Telephone: JUdson 6-8100.*

October 1-4. Produce Packaging Association 11th Annual Convention and Exposition:
Chase-Park Plaza Hotel, St. Louis, Mo. Contact: Robert L. Carey, executive secretary, Produce Packaging Association, P. O. Box 29, Newark, Del. *Telephone: ENdicott 8-2906.*

November 7-10. Packaging Machinery Manufacturers Institute Show of 1961:
Cobo Hall, Detroit, Mich. Contact: W. L. Redding, Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22, Pa. *Telephone: ATlantic 1-8552.*

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PACKAGE engineering

AN ANGUS J. RAY PUBLICATION

Articles

37 **Choosing the right package for fresh fruit,** by Noel F. Sommer, assistant pomologist, and Donald A. Luvisi, research assistant, University of California
Discussing the role packaging can play in protecting fresh fruit against physiological and pathological deterioration, and physical damage in transit.

44 **Single, centralized department proves its worth,** by Carl Krabbe, department head, fill and finish department, Corn States Laboratories, Inc.
How this recently created fill and finish department has led to increased packaging efficiency through improved methods, better equipment and flexibility.

48 **Skilled hands, simple devices "ring" jars into place for filling**
A funnel-shaped holder acting as moving device, filling guide, and equipment actuator, has helped boost Spice Islands Co.'s production 600 per cent in four years.

51 **Some highlights of this year's PI forum**
Award winners, new officers, and review of seminars and meetings of Packaging Institute's 22 Annual National Packaging Forum in New York City.

56 **Locking in package contents prevents damage, eases handling,** by Jack Klecka, packaging engineer, A. B. Dick Company
Practical development of an easy-to-handle bulk package that protects large rolls of fragile stencil tissue from damage and dust.

60 **Lab tests predict package performance,** by Frank A. Paine, senior scientist, packaging and conversion section, The Bowater Research and Development Company, Ltd., England
Concluding part of this two-part article gives transport test schedules for predicting package performance, and discusses tests for containers and materials.

98 **Cumulative editorial index for the year 1960**
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118 **What we think:** PI's plan to "go all pro" needs continuing support
Reader Service Cards inside back cover

Label casualties
prevented with a Tickometer

Use basic labels, with blank spaces for mandatory data or specifications. Use a Tickometer—to imprint ingredients, size, color, weight, price or code number on labels as you need them—for the day, lot, pack or special order. When label changes are necessary, change your Tickometer imprint quickly and easily. Avoid the waste of unusable pre-printed labels, cut label inventories and printing costs.

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A note from the Publisher

User-supplier cooperation increases profits

Recently I spent a week in New England visiting plants packaging a wide variety of products. Their packaging lines ranged from highly automated lines, employing every conceivable kind of machinery, to plants doing a great deal of manual packaging. The dozen plants I visited were busy; and the people I talked to, who were largely in engineering, were engrossed in improving their day-to-day operation, as well as looking as far as five years into the future as to how they could increase their companies' profits through more effective utilization of packages, packaging machinery and plant space.

It was readily apparent after the first two or three plants visited that the engineering-research-production groups are under tremendous pressures, between rising costs and heavy competition. It also suggested again the importance of cooperation between the package supplier and those men in user plants in engineering and package development.

For instance, companies packing in glass are demanding lighter weight glass containers and are running them on higher speed lines. The higher speeds subject the glass to more shock and make greater demands for close tolerances. The smaller amount of glass in these lightweight containers makes them much more vulnerable to breakage if there is variation in wall thickness. One packer told me that changing the mold mark from one edge of a rectangular bottle to the adjacent edge made it run better through his bottling line. Package manufacturing problems can and do affect packaging line efficiency.

No package is perfect, and all have problems, but many of these problems can be minimized if you visit your suppliers' plants and understand their manufacturing problems. Take them into your confidence, tell them what your problems are, and what you are trying to accomplish.

Angus J. Ray

Publisher

In our September issue, we quoted a letter from C. P. Olstad which implied that the Bartelt machine did not originate with Bartelt Engineering Company. For our own part, we do not know of any facts which would support such a contention. Indeed, Bartelt has, from its inception, carried on an extensive research and development program which has produced many original inventions as evidenced by the numerous patents granted to Bartelt.—A.J.R.

PACKAGE engineering®

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The PULSE / of packaging

Trends to watch:

More than 20 years of effort to improve banana packaging has culminated in STANDARD FRUIT AND STEAMSHIP CO.'s use of corrugated boxes—each filled *at the plantation* with 40 lb. of bananas. Hand-in-hand with Standard's development of corrugated boxes go its development of a disease-resistant banana and its use of hydrocooling. . . . Three trends affecting the oil industry's use of steel containers, according to VULCAN CONTAINERS' Vern I. McCarthy, Jr., include (1) decentralized container production and local warehousing, (2) growing attention to technical requirements for containers, and (3) more use of lighter gauge steel—e.g., 24, instead of 22, gauge for 120 lb./16-gal. grease drums.

Users of plastic bottles for pharmaceutical products see growing application of the built-in bellows construction. Squeezing the bottle (compressing the bellows) atomizes the contents—such as to spray a person's throat. . . . Aluminum cans with easy-opening lids (using a pull tab to remove lower seam) are results of a new process for manufacturing drawn aluminum cans recently announced by CENTRAL STATES CAN CORP., E. W. BLISS CO. and KAISER ALUMINUM & CHEMICAL CORP. Central States thinks coated aluminum coil stock and specialized manufacturing equipment make aluminum cans competitive with those of tin plate.

Problems of use-out and unpackaging continue to plague large packagers and users of industrial products. One big firm in the automotive field says 75 per cent of its unproductive labor is for unpackaging, is stepping up efforts to solve this problem. . . . We hear the Navy's packaging people are showing a lot of interest in lighter weight packages, hoping to save $4,000,000 a year in transportation charges. They want to dispel false notions of suppliers who think the military wants heavy, bulky packaging. Similarly, the Navy packaging people are taking a close look at skin and blister packaging to capitalize on its transparency for product identification (when printing gets obliterated), inspection of parts without tearing packages open, and less weight and cost of material.

Latest reports indicate all is not well with packagers pioneering the use of freeze-dry techniques. Illustrative of current difficulties: once dried this way the product is so fragile that breakage is a real problem. . . . Advocates of pressure packages for food see better days ahead once they start using a liquified gas propellant instead of those presently available. In this connection, we hear that THE DU PONT CO. is awaiting FDA approval on a new propellant of this type.

Blue-sky department for appliance makers: Some of their packaging experts think that within two years large appliances may go out in heat-shrinkable plastic film (to protect finishes) plus top and bottom polystyrene caps—all secured by fiber-reinforced tape strapping. What intrigues them, we hear, is their expectation of polystyrene prices dropping within a year to become competitive with corrugated board.

Aerosol packaging of pharmaceutical items is not limited to dermatologic products, according to E. R. SQUIBB & SONS, DIV. of OLIN MATHIESON CHEMICAL CORP. Squibb says the use of spray dressing in antiseptizing surgical wounds and skin problems is increasing by some 10 per cent per month. Its package: an extruded aluminum aerosol container (holding 2 oz.) with a beaded neck hugging the valve seat for product protection.

Latest reports from CAN MANUFACTURERS INSTITUTE indicate shipments of cans for soft drinks hit an all-time high recently, representing a 97.2 per cent increase over the same period of 1959. . . . Still recovering from effects of last year's 51-day strike of mold makers, glass container manufacturers look for better days ahead. THE VALUE LINE INVESTMENT SURVEY says the coming 12 months should give these companies more satisfactory pricing structures once prices stabilize, and projects a modest rise in unit sales—reflecting the population gain anticipated for 1961.

Packaging across the seas:

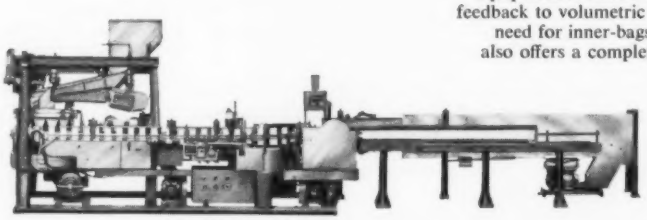
Seeking to keep American companies from getting into trouble over foreign purchasing, John R. Blinch, executive secretary of EUROPEAN FEDERATION OF PURCHASING OFFICERS, has been holding seminars in seven cities in this country, sponsored by Materials Management Institute and Industrial Education Institute, of Boston. He warned Americans to be familiar with differences in trade practice between European countries, noted that Southern (European) traders expect hard bargaining, while Northern Europeans submit firm prices not subject to negotiation.

All types of plastic materials are now in use for packaging applications, Dr. Nilo Galletti, president of the EUROPEAN PACKAGING

FMC Neverstop meets Lever Brothers requirements for high-speed carton filling

"ALL" detergent, marketed by world famous Lever Brothers, has been packaged on FMC Neverstop carton filling and sealing machines for several years. The performance-proved Neverstop assures Lever Brothers of consistent precision filling on long runs with a minimum of attention. The three carton sizes illustrated range from 1 lb. 8 oz. to 9 lb. 13 oz.

Lever Brothers is one of many well-known companies who rely on Neverstop for packaging such products as soap powders, cereals, rice, cake mixes, etc. • The Neverstop automatically opens cartons from a magazine supply then code dates, bottom seals, fills, top seals and delivers them under the supervision of a single attendant. • Six models offer a wide choice of speeds (up to 450 per minute), capacities (up to 10 lbs.) and carton sizes (up to 11" x 15"). • Three different types of filling methods—pocket, auger and the exclusive vibrametric system—are available to handle a broad range of product flowing characteristics. New multiple filling head can simultaneously fill two or three different products into a partitioned carton. • Optional equipment includes automatic checkweighing of each carton with feedback to volumetric control . . . and Calk-Sealing to eliminate the need for inner-bags or overwraps with certain materials. • FMC also offers a complete line of both automatic and semi-automatic fillers for medium and short production runs . . . and SIG double package makers for products requiring inner bags or overwraps.



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(and how the Arabol man helps you solve them)

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2. THE LAP ENDS WON'T HOLD—This may happen in your plant, or (worse luck) on the customer's shelf. One common cause is a change in the label stock, calling for an adjustment in your adhesive formula. Or perhaps the varnish has been carried over too far, leaving no selvage for the adhesive to grab onto. If so, a solvent-type adhesive is indicated. The Arabol man will know.

3. THE LABEL SHOWS "STRIKE THROUGH"—The difference in heat between the can and the adhesive may trigger a reaction which causes the adhesive to stain through the label. You may need a *harder* pick-up gum. Another possibility—a can has burst in the retort, spraying other cans around it with stain-producing material. The Arabol man will check every angle.

4. THE ADHESIVE "STRINGS"— Should your pick-up adhesive cool, it will thicken and "string" out from the roller. This usually happens when the thermostat on the machine fails to compensate for a temperature drop in the surrounding work area. Whatever the cause, it will pay you to get the Arabol man's advice.

THE BEST WAY to solve adhesive problems is to prevent them from happening. You can begin by telling us *all* the conditions your adhesive must meet—in your plant, in transit and after it reaches your customer. To help you understand these conditions more fully, we have prepared an interesting booklet that can save you no end of aggravation—and money. It's called "HOW TO BUY ADHESIVES—23 BASIC YARDSTICKS." Send for it today.

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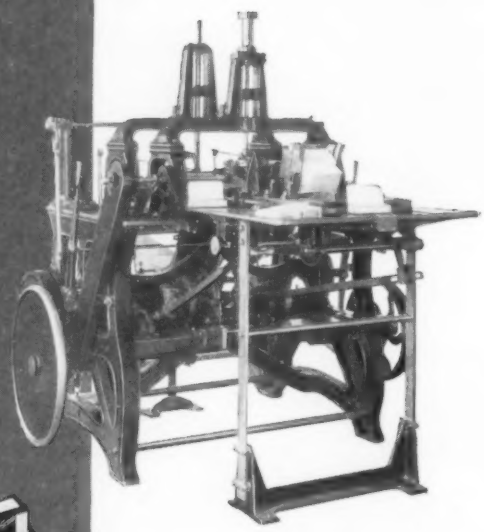

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FEDERATION recently told the American Management Association. He sees polypropylene as a strong competitor for cellophane. . . . Average growth of corrugated box production in Sweden for 20 years has been close to 7 per cent a year and is still increasing, according to Bengt Samson, executive manager, SWEDISH CORRUGATED FIBRE BOX ASSN. He says per capita consumption of corrugated boxes in his country is 30 lb. per person—next largest after the U.S. Last year his country produced 110,000 tons of boxes.

Machinery manufacturers report recent sales of automatic units and mechanized lines to Australian companies. Although that country's small population has kept some manufacturers from turning to high speed (they could produce a year's output in a very short while), reports indicate renewed interest in higher speed. . . . U. S. INDUSTRIAL CHEMICALS CO. has started construction of its European technical service laboratory in Baar, Canton of Zug, Switzerland. . . . ROYAL DUTCH SHELL plans to enter the polypropylene field working with MONTECATINI, the Italian chemical producer, either by license or in a joint venture with it.

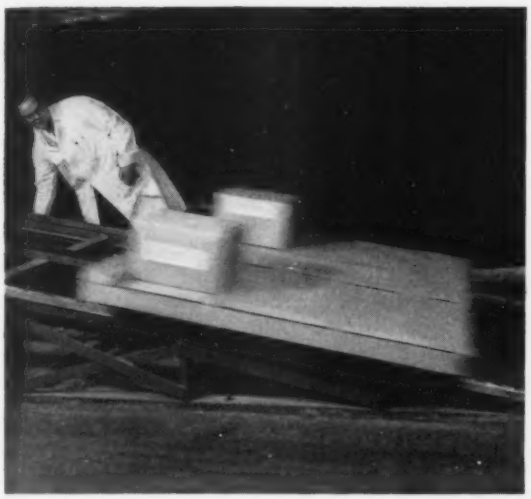
The EUROPEAN PACKAGING FEDERATION recently awarded 17 "Eurostars" to national award winners from Italy, Spain, Austria, France, Holland and Switzerland. Winning packages included a re-closeable, "pry-off" cap for baby food jars, a hermetically-sealed bag-in-box liquid container, an aluminum foil-paper "bake-in-wrap" package (you bake the cake in the wrapper), and a corrugated tomato transport container, among other award winners.

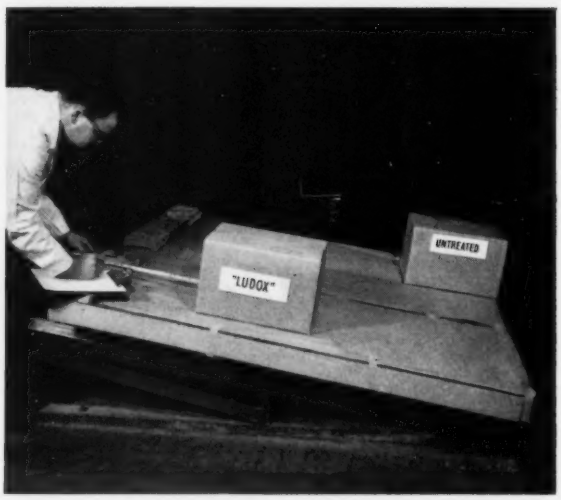
Notes from the government:

Among new reports on research findings issued by the U. S. FOREST PRODUCTS LABORATORY is its No. 791 "List of publications on box and crate construction and packaging data"—revised to include latest findings. You can get a single

Engineering Test Center finds...

A coating of Du Pont "Ludox" reduces slippage of corrugated cartons by two-thirds





Here's what happens when plane of Conbur inclined impact tester is released and strikes barrier at six miles per hour. Impact causes untreated carton to slide full length of plane. Other carton, treated with "Ludox" colloidal silica, moves only about one-third as far.

A sudden stop or start can send a stack of cartons sliding so easily that when a package is damaged during shipping, impact is the cause three times out of four. In such cases, the difference between costly damage and safe shipment can be a remarkably simple thing—an invisible coating of Du Pont "Ludox" colloidal silica.

To find out precisely what advantages "Ludox" offers package users, Du Pont's Engineering Test Center recently ran a series of studies using a Conbur inclined impact tester. Corrugated cartons coated top and bottom with submicroscopic particles of "Ludox" slid only about one-third as far as untreated ones.

Users of treated cartons say they are much more stable during in-plant handling as well, minimizing threat of injury to employees. What's more, they resist soiling and offer a sharper printing surface.

Coatings of "Ludox" can be applied to paper or to finished packages by either mills or converters. For names of suppliers of treated cartons and more information about "Ludox", fill out the coupon below.

Miller Brewing Co., Milwaukee, reports that antiskid coating of "Ludox" reduces product damage caused by falling boxes and makes palletizing safer for employees.

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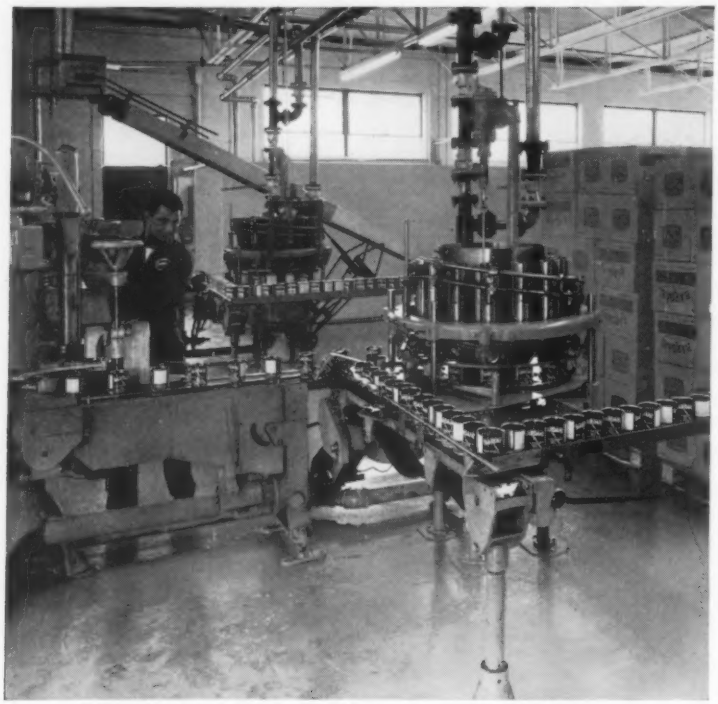

Two Pfaudler Rotary Piston Fillers package a variety of viscosities and container sizes at Bardahl Lubricants Inc., Norwood, Mass.

No filler maintenance in two years at Bardahl

No maintenance. No parts replacement. That's the performance record for these Pfaudler® RPL-14 Rotary Piston Fillers after *two years* of service.

Bardahl runs this production line with these two fillers handling oils which vary in viscosity from SAE-5W to SAE-50W. Filling rates are as follows: 4-oz. containers at 260 cans per minute, 15-oz. at 225 cans per minute, and quarts at 190 cans per minute.

These are *not* the top operating speeds for the RPL-14, since they are geared to Bardahl's *current* production requirements. Actually, these machines are capable of 350 quarts per minute.

Bardahl tolerates *no* spillage – and none occurs in this installation. One reason why you might consider Pfaudler fillers in your plant. Other reasons? **Simplicity** is a key factor. Pfaudler fillers offer a design in which piston and valves can be disassembled without tools in a few minutes. There are no connecting rods or wrist pins to wear out, no piston rings.

You can quickly clean and visually inspect both filler bowl and valve body. And all gearing is totally enclosed in an oil bath.

Accuracy can be held to ±1/10 of an ounce for most materials. You can adjust fill accuracy from a single control point, *without* stopping the machine.

Matched to your needs. The RPL-14 is one of a complete line of fillers from Pfaudler, each designed to meet specific oil packaging requirements. For example, the RPL-36 can handle as many as 800 quarts per minute.

More information. Bulletins No. 964 and No. 878 give specs on the Pfaudler line of fillers for oil packaging. For copies, or answers to your questions, write to our Pfaudler Division, Dept. PE-120, Rochester 3, N. Y.

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copy free from Director, Forest Products Laboratory, U. S. Department of Agriculture, Madison 5, Wis. . . . The U. S. DEPARTMENT OF COMMERCE, Commodity Standards Div. is holding a meeting in regard to its proposed commercial standard for polyethylene sheeting (TS-5501) at the National Bureau of Standards, Room 2029 Industrial Building, Washington, D.C., Wednesday, November 30, starting at 10:00 a.m. THE SOCIETY OF THE PLASTICS INDUSTRY, INC. requested the meeting.

Groups in the news:

Value analysis is a basis of standardization in packaging, Edwin C. Drew, Allied Chemical Corp., told the AMERICAN STANDARDS ASSN.'s 11th national conference on standards. He urged developing a program and following a set of tests calculated to analyze packaging values. Also from American Standard Assn., a new 8-page publication contains four new standards for American drums—covering 57-, 30- and 16-gal. drums. ASA, 10 E. 40th St., New York 16, N.Y will sell you this publication for $0.50 a copy.

LAMINATED FOIL MANUFACTURERS' ASSN. now has available a booklet covering standards for aluminum foil and various laminations with paper and board. It also contains conversion formulas. Copies are available from the Association, 1002 Union Trust Building, Providence 3, R.I.

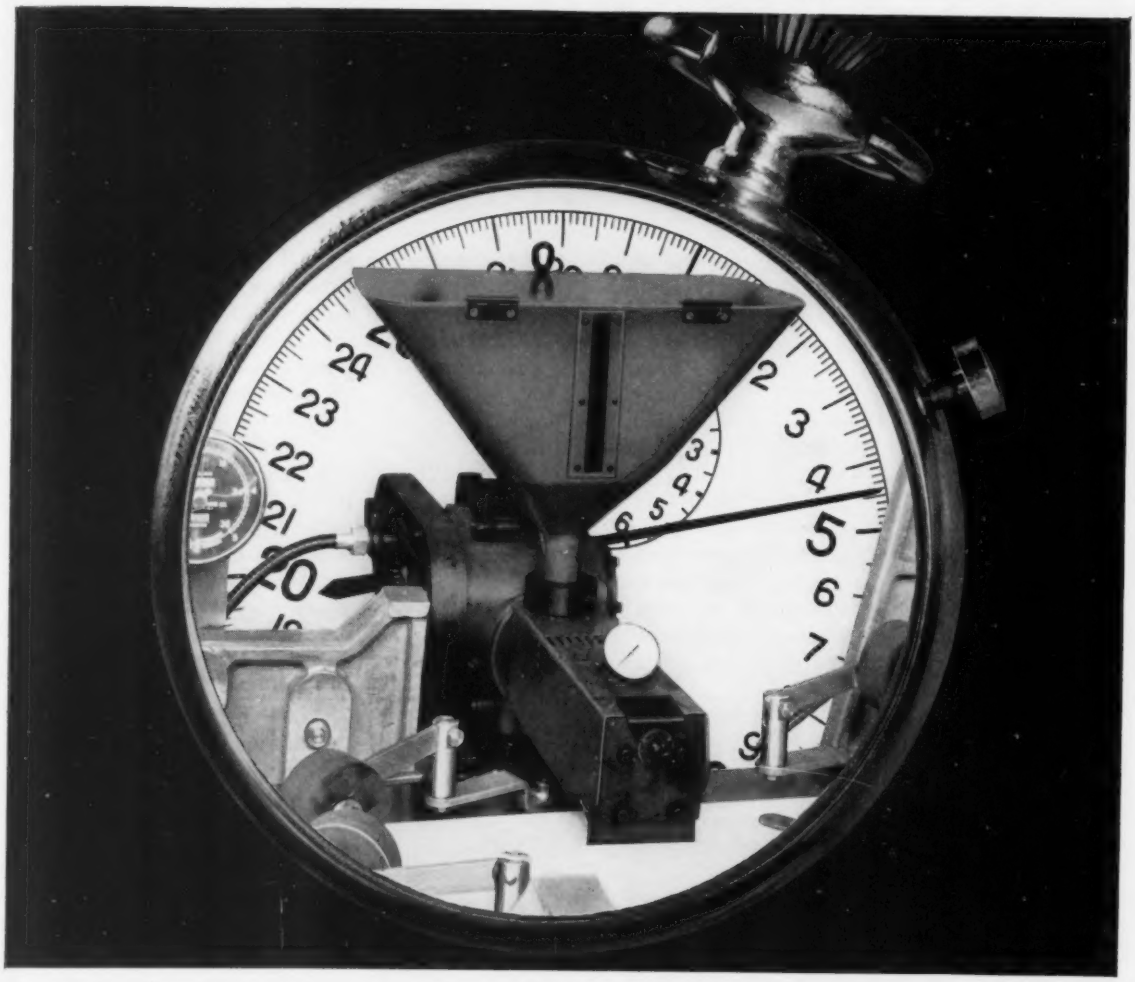
More expansion for packaging:

LUDLOW CORP. laid the cornerstone for its new research building at Needham Heights, Mass. . . . UNIVERSAL WIRE CO., subsidiary of Bostitch, Inc., will build a wire mill on 41 acres in Clinton, Conn. . . . ECONOMIC MACHINERY CO. is now exclusive sales and service agent for PACKER MACHINERY CO. products.

GENERAL FOAM CORP's. addition (its first basic manufacturing facility for urethane foam) to its Hazleton, Pa. plant is now

INSTANT-LOK

GRANULAR HOT MELT SYSTEM



INSTANT BONDS ON TOUGH SURFACES

You name it! Polyethylene, wax paper, foil, wet strength kraft, Saran—National's INSTANT-LOK SYSTEM bonds them all, *instantly*.

The INSTANT-LOK SYSTEM consists of granular, 100% solids resin adhesive melted and extruded through the applicator pictured above. A thin, instant bonding glue line results. Instant-Lok applicators are available exclusively through National.

The INSTANT-LOK SYSTEM offers the lowest cost form of adhesive. No water. No preparation. A range of formulations give high bonding strength, heat and oil resistance, and other desirable properties.

The INSTANT-LOK SYSTEM is suggested for bag seaming, carton sealing and forming, tube winding, and other converting operations. It can be adapted to machines you are now using or specified on new machines. Write or call your nearest National office for full details.

National ADHESIVES

NATIONAL STARCH and CHEMICAL CORPORATION

750 Third Avenue, New York 17 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

And All Principal Cities in the United States, Canada, England and Mexico

complete. . . . FEDERAL TOOL CORP., Lincolnwood, Ill., has merged with PROVEN PRODUCTS, INC. and FEDERAL PREMIUM SERVICE, INC., both of Skokie, Ill. . . . BEMIS BRO. BAG CO.'s $1,200,000 building program includes a new plant near Muskegon, Mich., and plant expansions in St. Louis, Claremont, N.H., Flemington, N.J., and Vancouver, Wash.

LERMER PLASTICS, INC. has acquired, adjacent to its present plant, 25,000 sq. ft. of manufacturing space which will double its production facilities. . . . U. S. TESTING CO., INC. has formed a food division. . . . STRONG COBB ARNER INC., custom packager and pharmaceutical manufacturer, has acquired RAWSON DRUG & SUNDRY CO., INC. . . . MARATHON, division of American Can Co., plans a food package manufacturing plant at Chambersburg, Pa.

PARAMOUNT PAPER PRODUCTS CO. has a new branch plant and warehouse in Los Angeles. . . . BROCKWAY GLASS CO. has acquired CELLUPLASTIC CORP. in exchange for 52,000 shares of Brockway common stock. The new acquisition will be operated as a subsidiary under the name Celluplastics, Inc.

THARCO CONTAINERS, Oakland, Calif., plans a 20,000-sq.-ft. warehouse and manufacturing expansion. . . . MILPRINT, INC.'s $3,000,000 South San Francisco facility, consolidating its West Coast activities, is now complete.

What people are doing:

THOMAS M. GLYNN is now vice president of manufacturing for John H. Breck, Inc., Springfield, Mass. He was previously plant manager. . . . PERRY D. LINDHOLM, formerly of Colgate-Palmolive Co., Kansas City, Kan., is now general manufacturing manager, Chesebrough-Pond's Inc., Clinton, Conn.

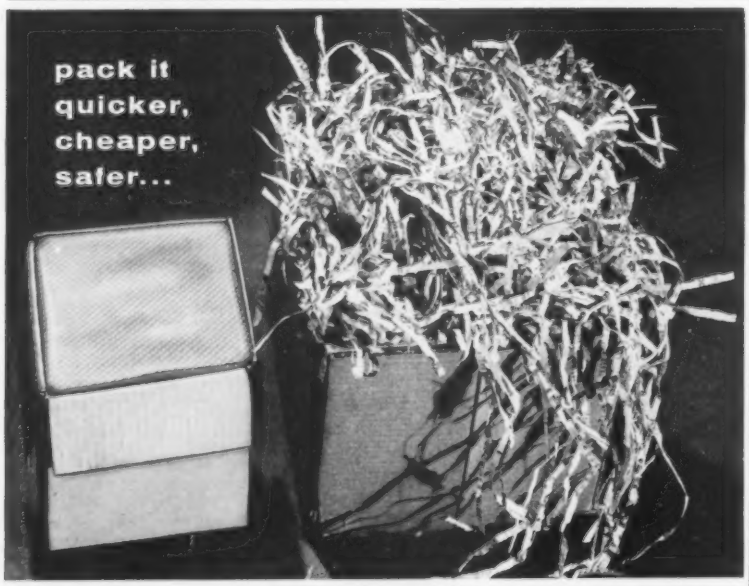
General Foods Corp. has appointed W. H. ENZIE to the newly created position of director, corporate packaging development. Mr. Enzie has worked in packaging research and development at General Foods for the past 12 years and formerly headed this area for the Birds Eye division. . . . HERBERT C. COOK has joined John C. Stalfort & Sons Co. Inc.'s Pressure-Pak division as pharmaceutical research chemist. He was formerly with a retail drug chain in Baltimore.

Real Gold Co. has appointed RALPH KNOX production control coordinator. . . . RONALD HOLT has been named project engineer and machine designer for Battle Creek Packaging Machines, Inc. Mr. Holt was formerly a machine designer for Phillips Petroleum Co. . . . Three purchasing promotions at Packaging Corp. of America are: HOMER BARBER, purchasing manager, central region; ROBERT G. STROUD, purchasing manager, eastern region; C. R. CULP, assistant director of purchasing.

JOHN K. QUINN, former assistant sales manager for Risdon Manufacturing Co., is now sales manager for New England and New York State for Oil Equipment Laboratories, Inc. . . . Container Corp. of America has promoted JOHN P. COSTELLO from packaging engineer to assistant sales manager of its Dallas-Fort Worth folding carton plant.

DANIEL J. BLOCH is now vice president of production for Minute Maid International, a subsidiary of Minute Maid Corp. Mr. Bloch will direct the coffee and concentrate production of Minute Maid owned or affiliated plants in Mexico, El Salvador, Guatemala and Germany. . . . EDWARD E. ALDRICH, who has been affiliated with Rexall for 30 years, has been promoted from general manager to vice president in charge of Rexall Drug Co.'s St. Louis laboratories.

ELMER F. HINNER, who is now a vice president will be succeeded by WERNER C. BROWN as general manager of Hercules Powder Co.'s cellulose products department. Mr. Brown was assistant manager of that department. *(End)*



PACK IT SMALLER WITH SHOKSORB

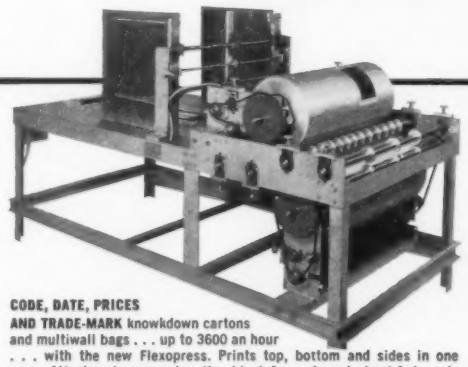
A few sheets of permanently cushion-molded Shoksorb protective packing paper can replace many cubic inches of bulk dunnage—cut carton size, packing and handling costs, shipping losses. Write for Shoksorb-bound picture-catalog of uses and types.

KIEFFER PAPER MILLS, INC.
BROWNSTOWN, INDIANA

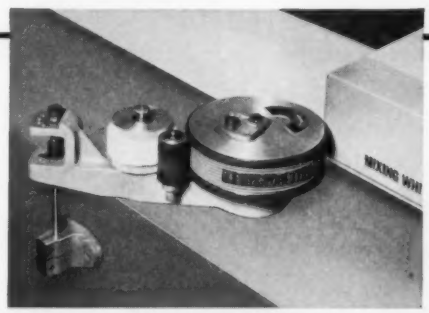
Do you have a 1961 PACKAGING LINE with an 1890 marking set-up?

Don't shackle your packaging line with an obsolete marking system. Look into the four IME imprinters on this page. All four synchronize to the speed of the line. All work smoothly, print distinctly, save you and customers time and bother. All offer heavy-duty construction for first-rate performance.

1961 packaging demands 1961 marking: IME marking. Performance guaranteed. For detailed, illustrated brochure write today. Dept. PE.

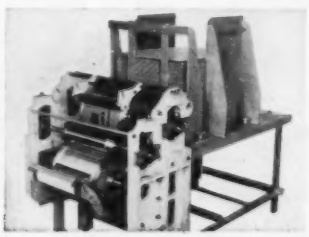


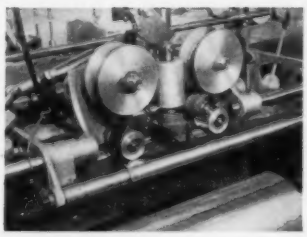
CODE, DATE, PRICES AND TRADE-MARK knowkdown cartons and multiwall bags . . . up to 3600 an hour . . . with the new Flexopress. Prints top, bottom and sides in one pass. Attaches to present units. Ideal for web and sheet-fed work, handling webs 1½" to 100" wide. Open-fountain inking system. Removable plate cylinders for off-press registration. Available in self-contained or "attachment" models.



PRINTS boxes, cartons and containers at production-line speed, whatever that speed may be. The Whippet® conveyor-line marker will mark all that passes it . . . easily adapted for top or side marking, too. Interchangeable type. Easy to maintain.

MARKS UP TO 3000 PER HOUR CARTONS AND BAGS AUTOMATICALLY: the #7 Autoprinter® Prints well on nearly every flat, absorbent surface, does one or both sides in one pass. Ink dries fast, doesn't cake . . . no need to clean rollers after use.





PLASTIC FILMS, FOIL, VIRTUALLY EVERY MATERIAL used in hot roll leaf imprinting can be clearly, colorfully marked with a Rainbow coding attachment. Wide range of colors. Ideal for both continuous and on-and-off work. 250 sharp impressions: only 1¢. No operator, no makeready.

ime INDUSTRIAL MARKING EQUIPMENT
655 BERRIMAN ST. | company, inc.
BROOKLYN 8, N. Y. | NI 9-3305

Planned Packaging moves merchandise

Ever play catch with an egg?

If you have, you'll appreciate the terrific protection job cartons perform. And they're marvels of packaging ingenuity, too!

Thousands of delicate articles . . . like electronic instruments, radio tubes, laboratory glass, precision machined parts . . . require kid-glove handling from manufacturer to user. Specially designed cartons that simplify insertion and closing enable faster filling line methods, save time and costs and provide maximum protection in transit.

Creative, cost-saving carton design is but one of countless ways in which Packaging Corporation of America's concept of Planned Packaging, implemented through integrated national facilities, produces better packaging . . . more sales. Whether your requirements are large or small, regional or national, we welcome the opportunity to help you.

Packaging Corporation of America

1632 CHICAGO AVENUE, EVANSTON, ILLINOIS

Cartons · Containers · Displays · Egg Packaging Products · Molded Pulp Products · Paperboards

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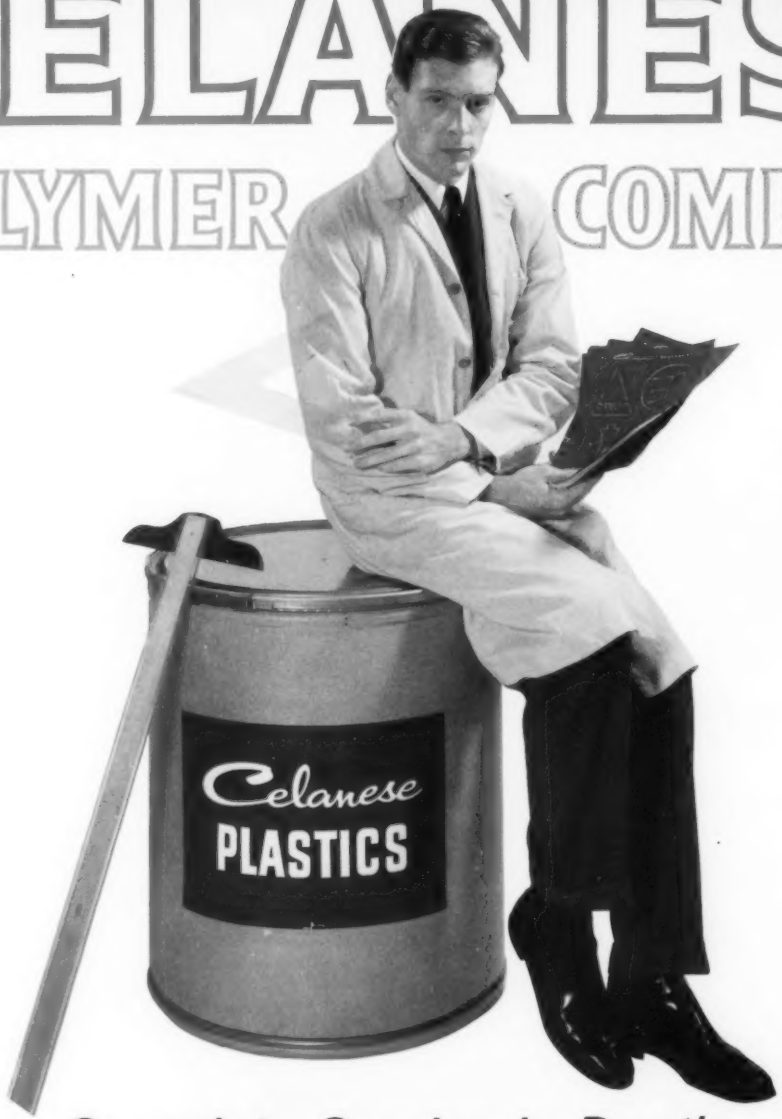
CELANESE
POLYMER COMPANY



Offers a Complete Service-in-Depth for Users of Plastic Materials

Celanese Polymer Company offers manufacturers, molders and product designers a comprehensive plastics service that includes assistance in application and design, plastics selection and product testing . . . laboratory and field service . . . and prompt deliveries from strategically located warehouse facilities.

Celanese Polymer Company is a Division of Celanese Corporation of America.

High, Medium and Low Density
POLYETHYLENE

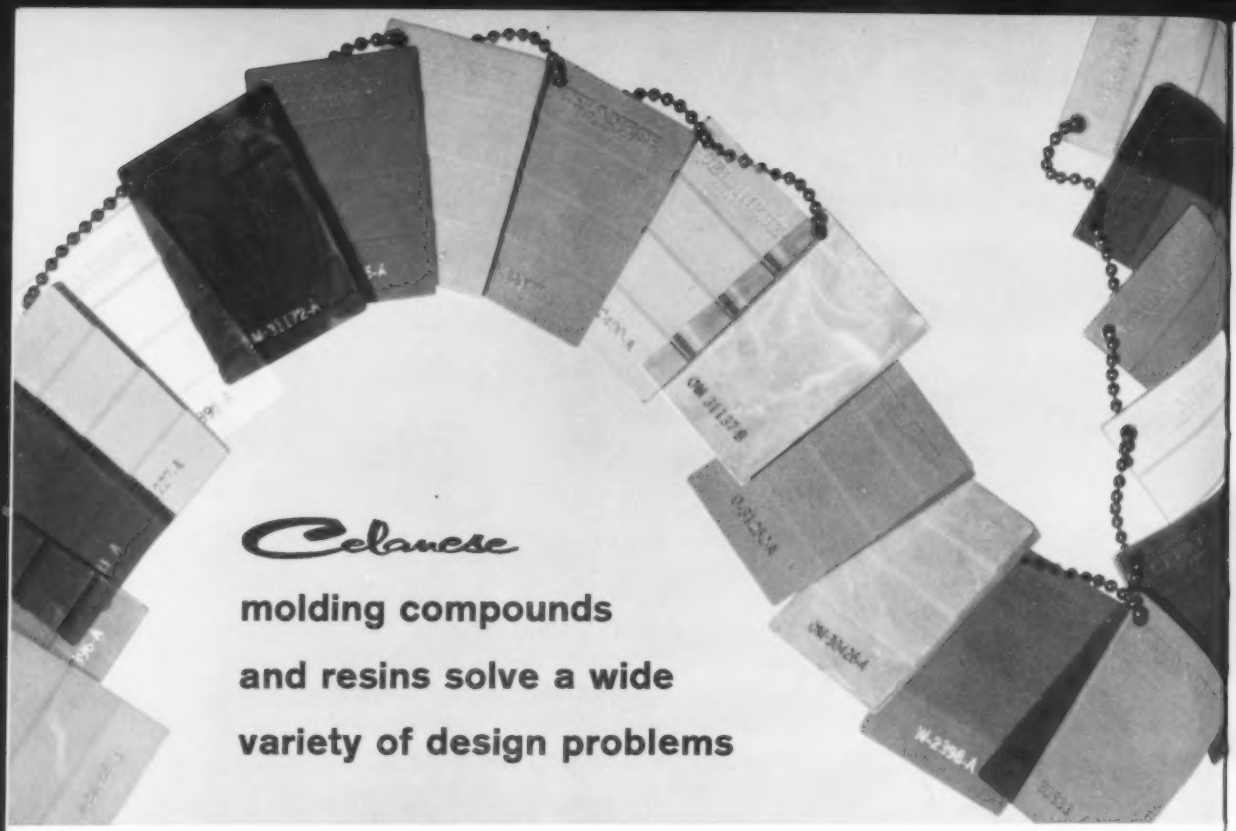
CELLULOSE PROPIONATE

CELLULOSE ACETATE

POLYESTER RESINS

Acetate, Propionate and Triacetate
CELLULOSE FLAKE

★ ★ ★
TECHNICAL SERVICE



Celanese molding compounds and resins solve a wide variety of design problems

FORTIFLEX . . . A Complete Range of Polyethylenes

Resins ranging from high to low density. There are four basic Fortiflex types: Series A, B, C, and D. Fortiflex A and B available in natural or scientifically color-matched to your specifications. Fortiflex C and D available in natural only. Applications: housewares, appliances, automotive and electrical parts, wire insulation, pipe, toys, containers, paper coating, film and sheet.

FORTICEL . . . Cellulose Propionate

Outstanding among thermoplastics for its excellent balance of properties, Forticel meets the demands of a number of automotive and appliance applications. Forticel has excellent dimensional stability, toughness, surface permanence and moldability, and is free of objectionable odor. Applications: automotive steering wheels and decorative trim, appliance and telephone housings, brush backs, dials, knobs and blow molded products.

ACETATE . . . Cellulose Acetate

Rugged, versatile, economical, Celanese Acetate is unequalled for its combination of toughness, clarity and price. It is available in a wide range of formulations and flows—in a limitless variety of scientifically matched colors. Applications: shoe heels, appliance housings, jewelry, tool handles, toys, sun glass frames, brush backs, houseware items and blow molded products.

POLYESTER RESINS

Here are the properties that speed production, cut down rejects. Celanese Polyester Resins offer fast cure, low drainage, better wet-out in hand lay-up. They are unequalled for saving time and labor on critical large area moldings. And they are outstanding for formulating and molding pre-mix and matched die parts. Applications: Boats, refrigerator doors, truck bodies, cooling tower grids, automotive and appliance parts, electronic housings, and decorative items.

CELLULOSIC FLAKES

Celanese offers cellulose acetate, cellulose triacetate and cellulose propionate flake in a variety of grades to basic industries such as plastics, sheet, film, fibers, protective coatings and adhesives. Specific applications include lacquer for paper, wire, and flashbulb coatings; film and sheeting for photography, graphic arts, and transparent packaging; molding powder for extrusion and injection molding of tool handles, tubing, and toys; and binders for color concentrates.

CELANESE TECHNICAL SERVICE

Celanese has the engineering staff to help you get the most out of plastic materials at any stage from design to finished product. This service includes: design consultation, assistance with mold design, material selection, equipment and its adaptation, pilot molding supervision and product testing.

The Celanese Technical Service Laboratory is one of the finest of its type. It is complete with actual production equipment, color matching departments, and analytical and physical testing laboratories. For the right answers to problems of plastic application, or technical information on specific plastic materials, write: Celanese Polymer Company, Dept. GK-11, 744 Broad Street, Newark 2, New Jersey.

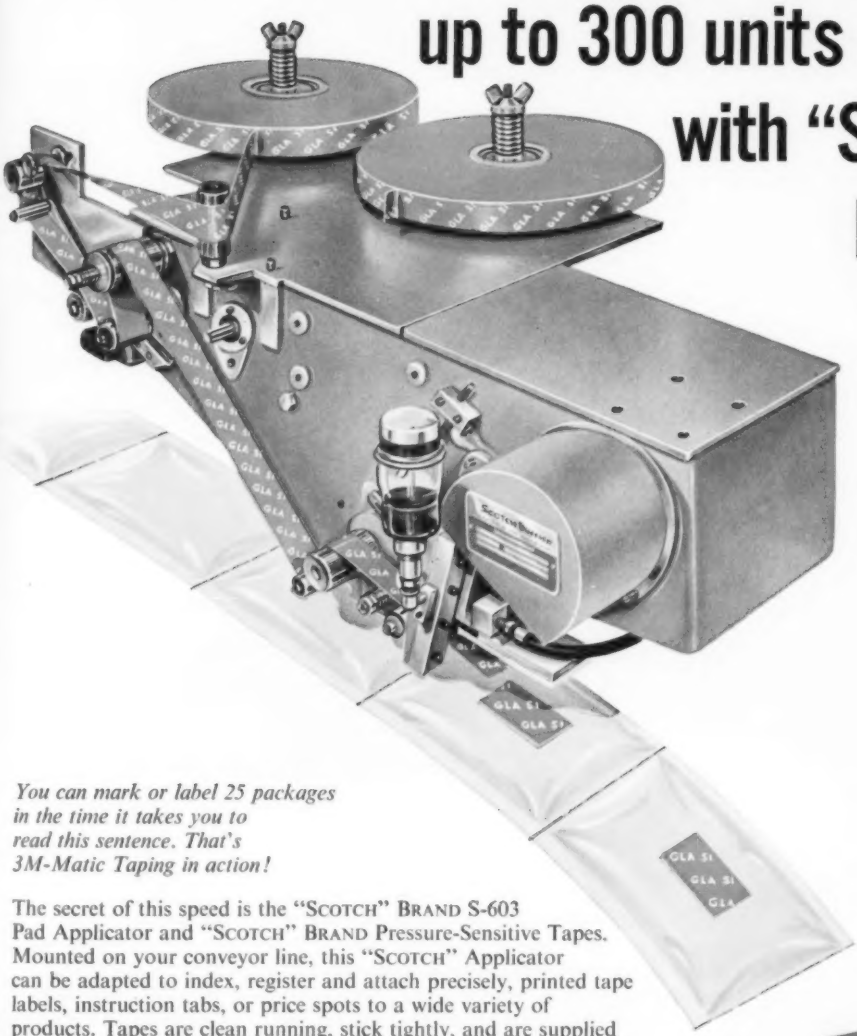
Celanese® Fortiflex® Forticel®

Celanese Polymer Company is a Division of Celanese Corporation of America.
Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver.
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16.

Celanese PLASTICS

MARK

up to 300 units a minute with "SCOTCH" BRAND Tapes



You can mark or label 25 packages in the time it takes you to read this sentence. That's 3M-Matic Taping in action!

The secret of this speed is the "SCOTCH" BRAND S-603 Pad Applicator and "SCOTCH" BRAND Pressure-Sensitive Tapes. Mounted on your conveyor line, this "SCOTCH" Applicator can be adapted to index, register and attach precisely, printed tape labels, instruction tabs, or price spots to a wide variety of products. Tapes are clean running, stick tightly, and are supplied in a rainbow of bright colors that can't smear.

Find out how you can save time and money with "SCOTCH" BRAND Tapes and 3M-Matic Taping methods. If you prefer, manually-operated dispensers are also available for rapid hand application of tape.

What's your marking problem? Bags . . . boxes . . . bottles . . . cans? Chances are your 3M Representative can solve it for you. Ask your local "SCOTCH" BRAND Tape Distributor for more information or write: 3M Co., 900 Bush Avenue, St. Paul 6, Minnesota., Dept. IAK-120.

When tape costs so little, why take less than "SCOTCH" BRAND?

SCOTCH BRAND

Tapes for Packaging

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

"SCOTCH" IS A REGISTERED TRADEMARK OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVENUE, NEW YORK 16, CANADA: LONDON, ONTARIO.

To modernize your packaging,

TENITE

"As a result of modernizing our packaging, together with greater product visibility, we have been able to increase substantially the volume which this fine product has already secured through the grocery stores across the nation."

—Harrison F. Dunning
Vice-President in Charge of Retail Marketing
SCOTT PAPER COMPANY

wrap in sparkling clear film of

POLYETHYLENE

SCOTT® is a registered trademark of Scott Paper Company

If your product is attractive by virtue of design or color, why not give that attractiveness a chance to work its maximum appeal? You can do this by packaging it in transparent film.

A good film to consider is that extruded from medium-density Tenite Polyethylene. Such film is clear, glossy and invitingly soft. This last property is particularly advantageous where you would like to have your product's basic softness fully conveyed to a prospective customer. (Bread and textile items, for example, have scored outstanding sales successes when wrapped in film of Tenite Polyethylene.)

While the film is soft to the touch, it possesses just the right degree of stiffness and slip for efficient use on high-speed packaging machines, where its wide heat tolerance also simplifies heat-sealing operations and minimizes waste. Its resistance to puncture and tearing is excellent, and this toughness helps protect the wrapped merchandise against damage and soiling during handling by shoppers. Other useful properties include high resistance to moisture-vapor transmission and the ability to take and hold whatever printed decoration you wish to apply over your package.

Film of Tenite Polyethylene is available from leading extruders across the nation. Look into its many advantages as a protective and sales-building wrapper, bag or pouch for your products. For more information on its over-all packaging usefulness, write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

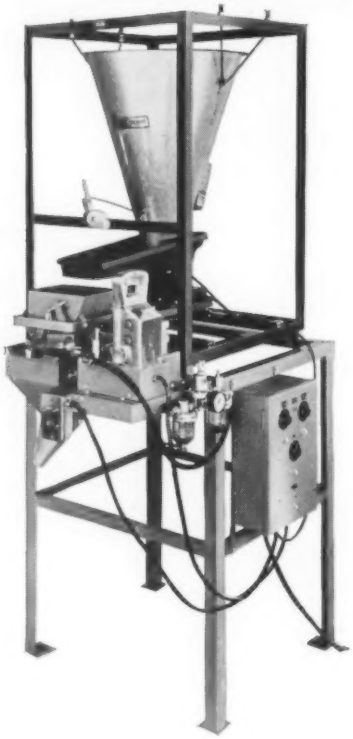
TENITE®
POLYETHYLENE
an Eastman plastic

EXACT WEIGHT® Automatic Net Weighing Machines

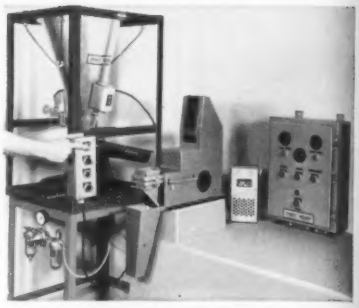
FOR PACKAGING, BAGGING, BATCHING, COMPOUNDING

Featuring

Over-under indicator for constant visual check on weighments



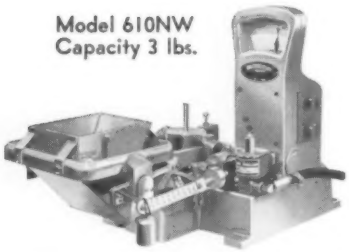
Model 620NW
Capacity 10 lbs.



PRECISION AUTOMATIC MODEL 4601NW

The machine above is designed for weighing dry, free-flowing materials with accuracies of 1/10 gram on quantities below 10 grams and one percent accuracy on quantities of 10 grams and above. Combines a high-accuracy Shadograph® Scale, air-operated dump mechanism, hoppers, vibratory feeders and photoelectric controls. Precision models with capacities from 50 grams to 500 grams. Write for Bulletin 3363.

Model 610NW
Capacity 3 lbs.



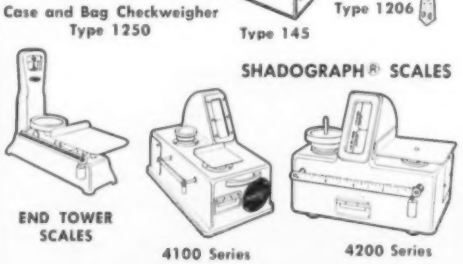
Net Weigher can be supplied without the feeder machine, support frame and discharge chute. The unit may be adaptable to your specific operation.

OTHER EXACT WEIGHT EQUIPMENT

SELECTROL® AUTOMATIC CHECKWEIGHERS

Case and Bag Checkweigher Type 1250 — Type 145 — Type 1206

SHADOGRAPH® SCALES



END TOWER SCALES — 4100 Series — 4200 Series

High speed, smooth operation and accurate control are among the many advantages offered by Exact Weight Automatic Net Weighing Machines.

Accuracy is assured by the 1:1 ratio lever-design precision industrial scale incorporated in each machine. A special feature is the over-under indicator dial that enables the operator to observe accuracy of each weighment. Visual indication eliminates the need for checkweighing—stops overweights. Machines are available in capacities from 1 gram to 300 pounds, either fully-automatic or semi-automatic models.

Exact Weight offers counsel for weighing problems based on 45 years of experience in industrial scales for all type of applications. Our recommendations will be tailored to your specific needs . . . and at no obligation. Write for Form 3311.

THE EXACT WEIGHT SCALE CO.

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Exact Weight SCALES

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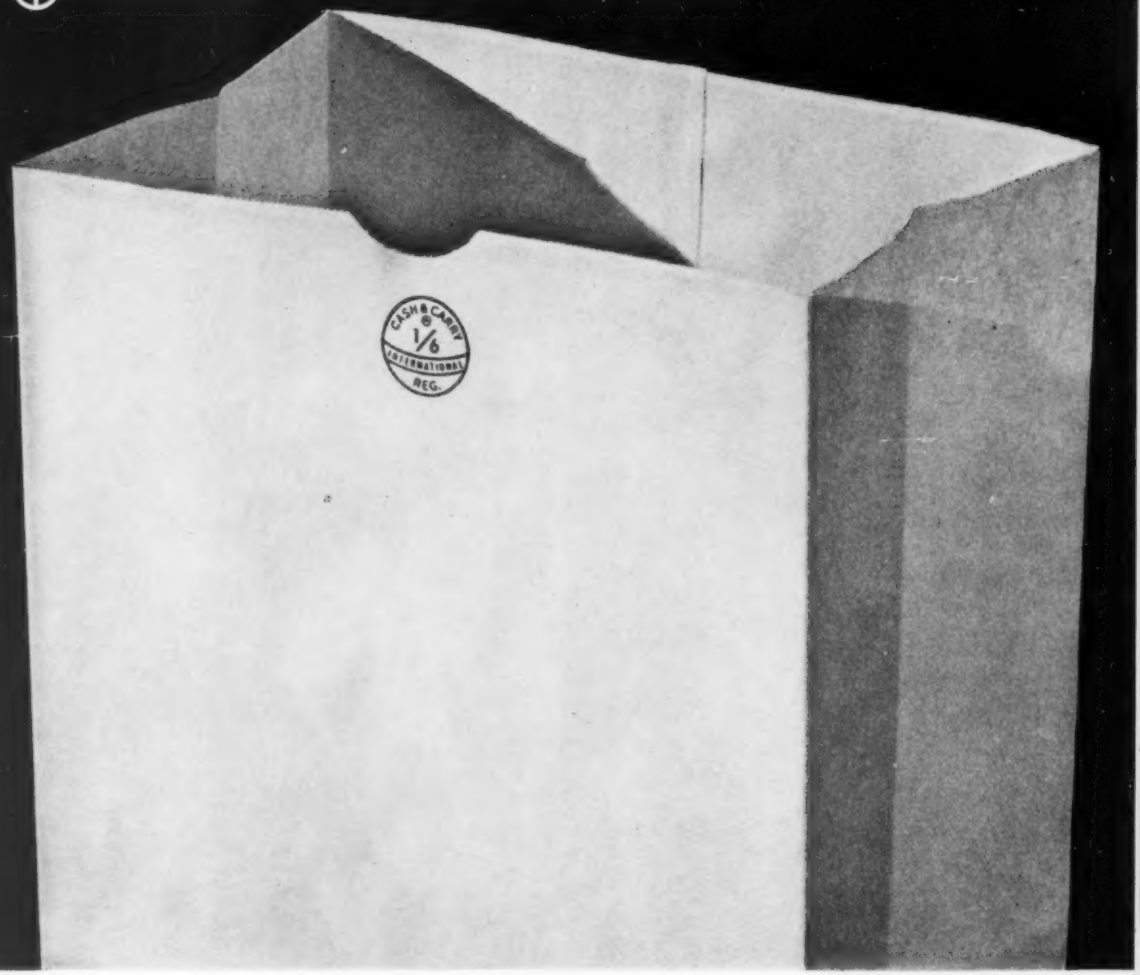
INTERNATIONAL PAPER—The Ultimate Source



How to guarantee a strong, uniform paper bag

(You can get one every time—thanks to International Paper)

Read why International Paper's Gator-Hide® is the world's most widely used kraft paper.

International Paper makes Gator-Hide into billions of grocery, department store, bakery, produce and garment bags. Bags of every description.

Industry also relies on this versatile Gator-Hide line for a myriad of converting uses.

How does International Paper's Gator-Hide put strength into a paper bag? Into paper packaging of all kinds?

For over 30 years, International Paper craftsmen have built strength *into* this kraft paper by carefully controlling every step of the paper-making process. From seedling to finished roll. A roll that always meets exacting specifications.

The future of this strong wrapping, packaging and converting paper is unlimited. Its versatility will contribute to the science of packaging for years to come.

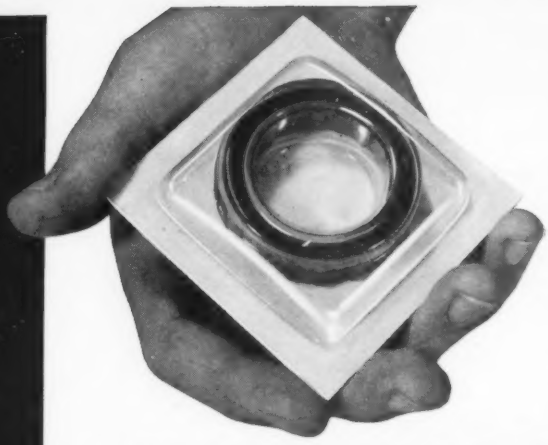
Last year, our staff of 322 package and research counselors answered outside inquiries at the rate of one every seven minutes.

International Paper can provide you with the widest range of papers, boards and packaging assistance in the industry. Call us or contact your paper merchant or converter—he's probably been doing business with us for years.

INTERNATIONAL PAPER New York 17, N. Y.

Manufacturers of papers for magazines, books and newspapers • papers for home and office use • converting papers • papers and paperboards for packaging • shipping containers • folding cartons • milk containers • multiwall bags • grocery and specialty bags and sacks • pulps for industry • lumber, plywood and other building materials

Blister packs ...always clear and perfect



New Sundstrand Model 58 Packmaster vacuum-draw designed for each package — can be changed over in five minutes.

Butyrate or acetate film blisters produced on the Packmaster never become discolored or get milky. They're sparkling clear right out to the corners — even on irregularly shaped packages.

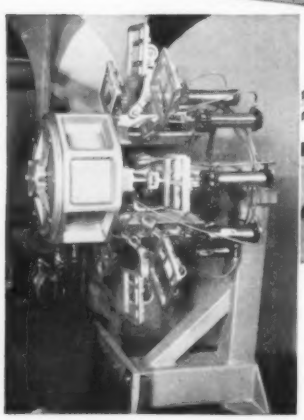
Instead of conventional die change-overs, the Packmaster employs a complete interchangeable drum assembly for each package as illustrated at the lower left. With this arrangement the vacuum-draw of each drum is factory-engineered for the specific die, insuring blisters of perfect transparency.

Complete change-over of the drum assembly takes five minutes or less. Wheel-mounted, it is rolled up to the machine located on two dowels and screwed securely in place by hand. Two hose connections for air and vacuum are provided with quick disconnect fittings. The Packmaster runs heat-sealed blister packs in sizes up to 6 x 6 x 1¾″ in regular or irregular shapes at rates up to 125 per minute (3 x 3″ package).

SUNDSTRAND-AMERICAN BROACH

ANN ARBOR, MICH. Division of SUNDSTRAND CORPORATION

MARK OF SUNDSTRAND RELY-ABILITY



For complete information, ask for Model 58 bulletin.

EASY CHANGE-OVER of complete drum assemblies makes the Model 58 Packmaster profitable on short- as well as long-run production. *Stand-by film and paper rolls* eliminate shutdowns — when one roll is almost used up, the stand-by roll is spliced in one continuous feeding. Enclosures around film, oven, and sealing assemblies keep out dust. Control console centralizes all operations.

PAPER ART CO., INC. GOES 100% TO POLYETHYLENE FILM, IMPROVES PACKAGES, AND CUTS PRODUCTION COSTS

Paper Art Co., Inc. of Indianapolis, Indiana, has cut production costs substantially with a modernized production and packaging system using cast polyethylene film. According to the company, savings in packaging costs for the first quarter of 1960 averaged 47% as compared with the same period in 1959, while total production increased 5%.

The high-clarity, high-gloss film gives the company's packages a sparkling, attractive appearance . . . allows designs and colors of its plates, cups, napkins, table cloths and 400-odd other paper products to show through clearly. And polyethylene's excellent aging and strength characteristics have eliminated problems of embrittlement and tearing . . . improved shelf life of packaged products.

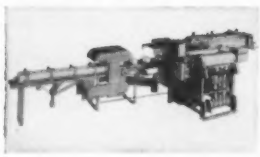
The film, which is cast from PETROTHENE® polyethylene supplied by U. S. Industrial Chemicals Co., makes possible a number of economies. With polyethylene, six "See-Safe" semi-automatic packaging machines, designed for handling this flexible film, can turn out 45,000 packages per 8-hour shift, replacing 11 packaging machines formerly used to do the same job. Both labor and materials costs are cut. Returns due to package breakage, too, are reduced, thanks to the tough long lasting polyethylene films.

By using polyethylene, you can enjoy the benefits of strong, low-cost, transparent packaging. Up-to-date packaging machinery lets you take full advantage of polyethylene's characteristics . . . turn out attractive packages of outstanding durability at high rates. For more information on cast polyethylene film made from PETROTHENE resin, or on packaging machinery such as shown above, write to the address below.

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corp.
99 Park Ave., New York 16, N. Y.
Branches in principal cities

IF ANY OPERATION IN YOUR PLANT CALLS FOR HIGH-SPEED, AUTOMATIC OVERWRAPPING...

BATTLE CREEK MACHINES CAN PROBABLY DO IT BETTER, FASTER, MORE ECONOMICALLY THAN ANY OTHER



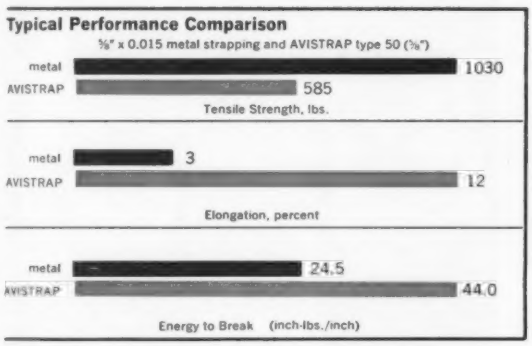
Paper products must be packaged economically, attractively and afford thorough protection at the point of sale. The Model 475 weld seals polyethylene at speeds up to 75 per minute . . . handles such items as flat stationery, envelopes, napkins, filler pads, and toilet tissue packs in any of 40 different heat sealing film formulations. If your products are within a range of 5″ to 12″ lengths, 3″ to 8½″ widths or ¼″ to 4″ heights; investigate the Model 475 today.

Continuous Flow® PACKAGING

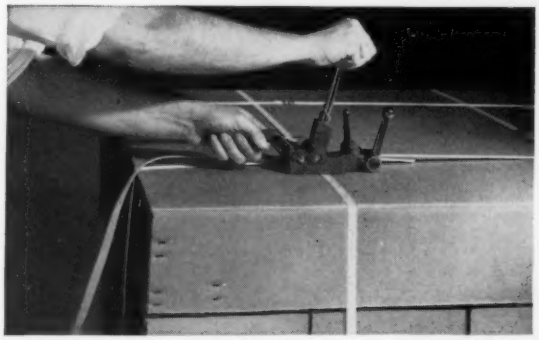
BATTLE CREEK *packaging machines, inc.*, BATTLE CREEK, MICH.

NEW TOUGHNESS

It actually takes more energy to break AVISTRAP cord strapping than to break comparable-width metal strapping. Though metal has greater tensile strength, AVISTRAP—made of high-tenacity Avisco® rayon—has greater "working toughness." Strapping must either extend enough to absorb shock-energy or fail. Metal strap has far less elongation before breaking than AVISTRAP. As a result, AVISTRAP is still stretching, soaking up energy, and holding the package together after a metal strap would have stretched to its breaking point and failed.



Vital statistics. This comparison is the result of careful laboratory tests, using an Instron Tensile Testing Machine. In tests covering metal strapping from ¼" through ¾" width and from 0.012 through 0.023 thickness—AVISTRAP outperformed metal in terms of energy to break in every instance.



Toughness pays off here. AVISTRAP can be tightly tensioned without danger of sudden breaks, will not lash out with jagged ends. Strap breakage during handling and shipping is reduced. Other advantages: no sharp edges, light weight, easy handling, easy unpacking.

AVISTRAP* CORD STRAPPING

Economy • Local Service • Easy Handling • Reduced Damage • Safety

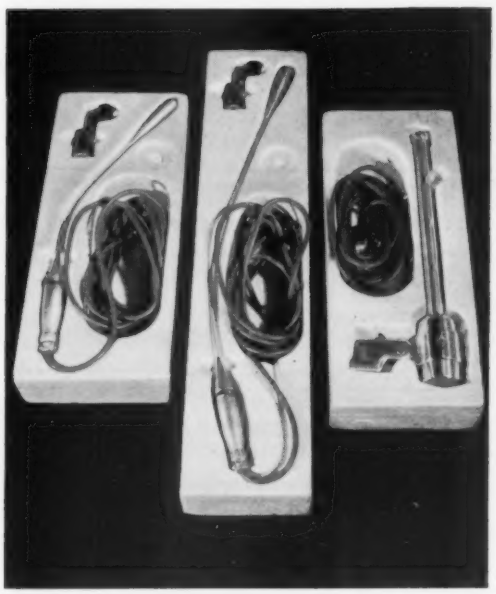
*Trademark of American Viscose Corporation, Patents Pending.

Write for technical bulletin #4, covering AVISTRAP cord strapping strength tests. Include any other specific technical questions you may have. If you wish, arrangements can be made to demonstrate AVISTRAP cord strapping in your plant. AVISTRAP cord strapping, tools, accessories and application services are now available in all major U.S. industrial areas, through authorized local distributors. AVISTRAP district offices are listed below.

AMERICAN VISCOSE CORPORATION, INDUSTRIAL PACKAGING DEPT., 1617 PENNSYLVANIA BLVD., PHILA. 3, PA.
District offices: Atlanta, Ga., Boston, Mass., Charlotte, N.C., Chicago, Ill., Columbus, Ohio, Dallas, Tex., Denver, Colo., Los Angeles, Calif., New Orleans, La., New York, N.Y.

DYLITE protects acid bottles.

This DYLITE package gave the Allied Chemical Corporation better, lower-cost protection than was possible with previous packaging materials. The octagonal-molded block cushions the 13-gallon acid carboys, it protects them from vibration and impact damage. The package is completely ship-safe. Around the plastic package is a wooden shell bound by wire. The container is lighter, takes up less space, and saves packaging and shipping costs. At the 1960 Industrial Packaging Competition sponsored by the Society of Packaging and Handling Engineers, this new DYLITE package won the "best of show" award. *Molded by General Chemical Division, Allied Chemical Corporation.*

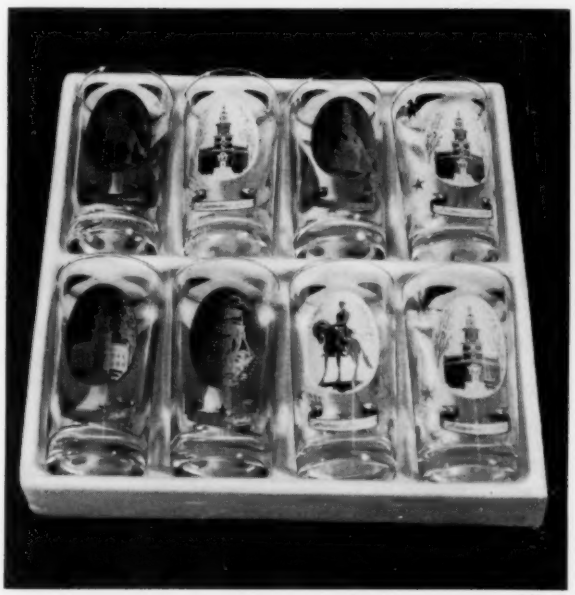


. . . insures a safe and sound mike.

Because of its unusual shape and sensitive parts, this microphone presented a definite packaging problem. Shock-resistant DYLITE was chosen because it molds easily, to *any* size or shape. The DYLITE is custom-molded to tightly fit the contours of the instrument. The microphone is held firmly in place, safe from shipping damage. DYLITE offers complete packaging protection for any sensitive, delicate instrument and its component parts. *Molded by Formex Corporation of Elkhart, Indiana. Microphone manufactured by Electro-Voice, Inc., of Buchanan, Michigan.*

Protect your product with low-cost DYLITE® packaging!

Here's a packaging material . . . DYLITE expandable polystyrene . . . that combines all the ingredients of good protective packaging. DYLITE is lightweight, strong, and shock-resistant. It is low-cost and makes a better-looking package. Here are three good examples of DYLITE packages.



. . . keeps eight tumblers intact.

Here's a package that's attractive as well as protective; it gives the product added sales appeal. And these 10-ounce, Americana-patterned tumblers fit snugly in the molded DYLITE tray. There's no vibration, no glass breakage. Versatile DYLITE is used for packaging many products: typewriters, radios, precision instruments, cameras, musical instruments, tools, and many others. DYLITE can make your next product package better at lower cost. For more information on DYLITE expandable polystyrene, write Koppers Company, Inc., Dept. PG 120. Pittsburgh 19, Pa.

Tray molded by Expandable Plastics, Akron, Ohio.
Tumblers by Libbey Glass, Toledo, Ohio.

KOPPERS PLASTICS

Koppers also makes these other fine plastics for packaging: DYLENE® polystyrene, DYLAN® polyethylene, SUPER DYLAN® polyethylene.

Famous remedy continues to thrive

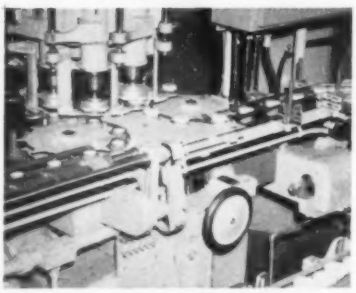
Advertisement

NOXZEMA KEEPS PACE WITH MODERN METHODS

- Up-to-date merchandising and machinery feature success
- Pneumatic equipment plays important role

Born in a back room of a Baltimore pharmacy in 1914, Noxzema has grown in stature so that today, to millions of Americans it is a symbol of skin care and skin comfort. Highly competent, imaginative merchandising and the maintenance of maximum manufacturing efficiency through the use of up-to-date machinery have helped keep Noxzema a front runner in its field for over 35 years.

Noxzema's packaging facilities are a notable example of the company's progressive type of operation. In readying the Noxzema jar for market the knurled, turn-on closures are uniformly applied by Pneumatic Rotary Capping machines which keep the containers moving smoothly at speeds up to 120 units per minute. The capped jars then move into the intakes of Pneumatic Duplex Labelers which simultaneously apply front and back labels, accurately registered and put on to stay.

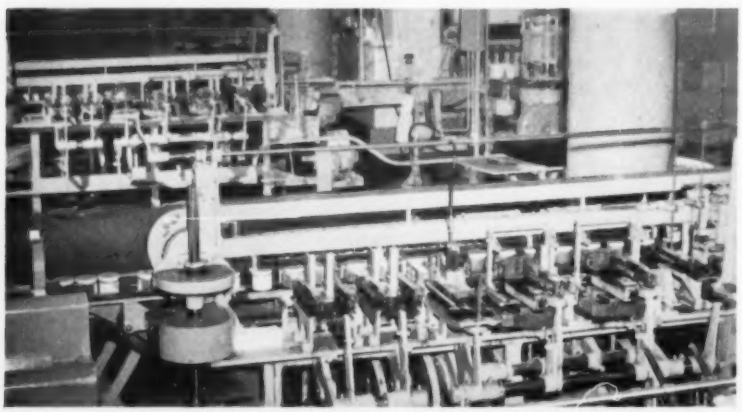


8-head Pneumacap machine in operation at plant of Bunting Chemical Company.

Noxzema's new High Noon sun tan lotion is packaged in attractive plastic tubes. The tubes are filled and sealed at high speeds on a machine built by Pneumatic's Carbert Manufacturing Company Division. Another example of Noxzema's policy of keeping pace with the last word in packaging.

In its part of Noxzema's packaging processing, Pneumatic's modern equipment, built to fine precision standards with all the latest refinements in design, delivers the same "lower cost per container" operation which has attracted America's leading producers of bottled and packaged goods. Pneumatic could well help you to better, more economical bottling or packaging, too.

PNEUMATIC SCALE CORPORATION, LTD., 77 Newport Avenue, Quincy 71, Mass. Sales Offices: *New York; Chicago; Dallas; Rochester.* Agents: *Fred Todt Company at Los Angeles, San Francisco and Seattle. Rockwell Pneumatic Scale Ltd., Edgware Road, London, N.W. 2, England; O.R.M.A., Paris 8, France; Carbert Manufacturing Co., Division, Cambridge, Mass.; Delamere & Williams Co., Ltd., Toronto.*



Front and back labels are applied simultaneously to Noxzema skin cream jars by duplex McDonald-type labeling units.

PNEUMATIC

For more information circle No. 223 on Reader Service Card

The case of the firemen's fix

MISS WATSON: Fearless, you're late this morning. Where have you been?

FEARLESS FULLER: I stopped off at the local fire station.

MISS WATSON: For a quick game of checkers?

FEARLESS FULLER: No, Miss Watson. This happens to be the season of the year when our men in blue are quite busy repairing toys for some of our city's less fortunate youngsters.

MISS WATSON: A wonderful undertaking. But how do you fit in?

FEARLESS FULLER: Well, as you know, they get all types of toys. Wooden toys, metal toys, plastic toys, rubber toys, china dolls —almost everything imaginable.

MISS WATSON: I guess that's true.

FEARLESS FULLER: Well, repairing broken toys requires adhesive in many instances, so Captain Barnes called on me for advice.

MISS WATSON: Did you solve his problem?

FEARLESS FULLER: Yes. Fortunately, Fuller makes many, many types of adhesives. We've got an adhesive suited to practically any bonding job.

MISS WATSON: You mean, for instance, Fuller even has an adhesive for bonding metal to metal?

FEARLESS FULLER: That's right. As the famous comedian says . . . we got a million of 'em!

MISS WATSON: How are you going to write off the adhesives you're donating to fix the toys?

FEARLESS FULLER: I'll slip the cost into my expense account.

MISS WATSON: Under what category, pray tell?

FEARLESS FULLER: Christmas spirits, Miss Watson. Christmas spirits.

MISS WATSON: Fearless, you're the best boss a girl ever had.

FEARLESS FULLER: Thank you, Miss Watson. It's just that a Fuller man always knows the solution to adhesive problems.

Your Fuller man is ready with the correct solutions on any adhesive problems for you, too. Contact your near by plant.

H. B. Fuller Co.

INDUSTRIAL ADHESIVES

St. Paul, Minnesota

St. Paul, Minn. • Atlanta, Ga. • Buffalo, N.Y. • Chicago, Ill. • Cincinnati, Ohio Dallas, Tex. • Kansas City, Mo. • Linden, N.J. • Los Angeles, Calif. • Memphis, Tenn. • Portland, Ore. • So. San Francisco, Calif. • Tampa, Fla. Also Winnipeg, Can. • Fuller Adhesives International, Nassau, Bahamas

MARLEX*... for quality packaging with greater sales appeal!

Which of these modern packages is right for your product? Whether it's a blow molded bottle, extruded tube, film overwrap, a thermoformed or injection molded container; the result will be increased sales appeal with a package made of MARLEX plastics. Attractive appearance . . . excellent feel are two reasons. Wide temperature range is another. MARLEX high density polyethylenes and ethylene copolymers withstand temperatures from 250° to −180°F. Alkalies, acids, chemicals, oils and greases are no problem. And MARLEX is odorless, tasteless, non-irritating, and biologically inert.

To packagers, the high quality of MARLEX resins means truly efficient package production . . . easier printing, wrapping, filling, sealing. Moreover, the skills of Phillips seasoned research personnel working with extensive sales laboratory facilities are available to MARLEX users. Phone or write for full details.

*MARLEX is a trademark for Phillips family of olefin polymers.

PHILLIPS CHEMICAL COMPANY, Bartlesville, Oklahoma, a subsidiary of Phillips Petroleum Company

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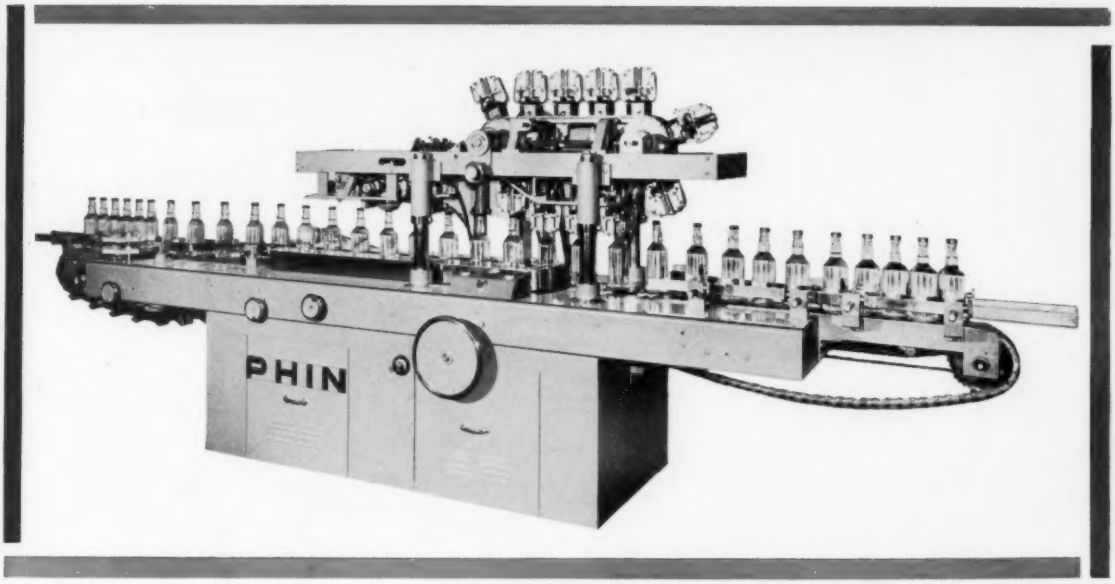
EXPORT: PHILLIPS PETROLEUM INTERNATIONAL CORPORATION • P. O. Box 7239, Panama City, Panama • Sumatrastrasse 27, Zurich 6, Switzerland

PHILLIPS 66 MARLEX PLASTICS



New, High Speed Strip Stamp Machine

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- **Straight line, continuous motion operation**
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Adjustability and Range. Miniature to quarts, round, flat, oval or square. Change-over 30 minutes or less.

Guaranteed Production. Standard Machine.....120 per minute
High Speed.....200 per minute

Finished Job Guaranteed. Complete coverage of adhesive full width of stamp. Complete adhesion of stamp to bottle. Stamp ploughed into crevices of cap and bottle neck. No loose edges to cause stamp damage when bottles are handled. Accurate application and positive registration of stamp to bottle—same bottle can be run through the machine six times, stamp on stamp, with complete registration accuracy.

Adhesions. Practically all types of adhesives can be used, including latex, hot melts, etc.

Send one capped, labeled, empty bottle of each of your sizes to Toronto and ask us to give you complete particulars.

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PACKAGE

With stamp applied to cap (*above*) pressure pads descend, grip bottle, and fix stamp firmly to the exact contours of cap and bottle neck. Finished, stamped bottles (*below*) are taken off on a moving conveyor.

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CHANCES ARE YOU ARE WASTING UP TO 10% OF YOUR TAPE COSTS *through excessive curling...*

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Please send Free copies of ☐ "Gummed Tape Tips from Gilman" . . . ☐ Color Swatch Book. Also, Free sample ☐ "Cold-Rolled" Gummed Tape ☐ "Cold Rolled" Reinforced Tape ☐ Asphaltic ☐ Non-asphaltic

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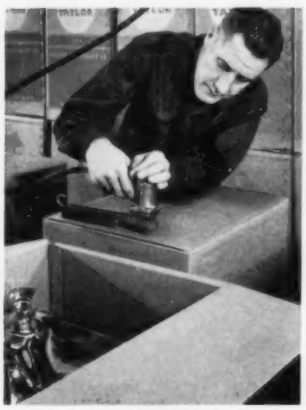
*Trade Mark

a boat manufacturer did ... Now, packing boats in stapled corrugated cartons takes half as long as nailed crates and the reduced weight cuts freight costs.

a ski manufacturer did ... It takes only 2½ minutes to pack a pair of skis compared with 7½ minutes by the old method—stapling is 3 to 4 times faster. For ski accessories, the company changed from wooden boxes to stapled cartons — transportation costs were cut 50 per cent and packing time 75 per cent.

PROVE

TO YOUR SATISFACTION IN YOUR OWN SHIPPING ROOM THAT BOSTITCH STAPLING SAVES TIME, MONEY AND SPACE, AND REDUCES DAMAGE CLAIMS



a water fountain manufacturer did ... And production went up to a carton a minute compared to one every five minutes with nailed wooden cases. A 55 per cent decrease in damage claims and an 18 to 20 pound decrease in shipping weight plus a saving of 1900 cubic inches in size helped increase profits.

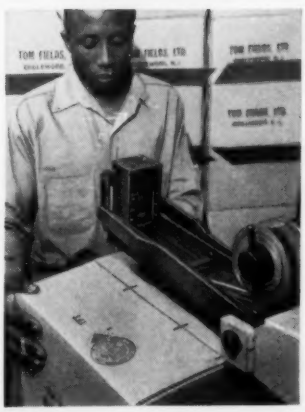
an oil-heater manufacturer did ... By putting ton-and-a-half oil heaters in Bostitch-stapled cartons, packing costs were cut 50 per cent and freight costs also reduced. Shipments have been completely damage-free.

Call the Bostitch Economy Man for an in-plant demonstration in your shipping room. He can prove—with your own personnel—that Bostitch in your plant will improve shipping operations. He's listed under "Bostitch" in your phone book.

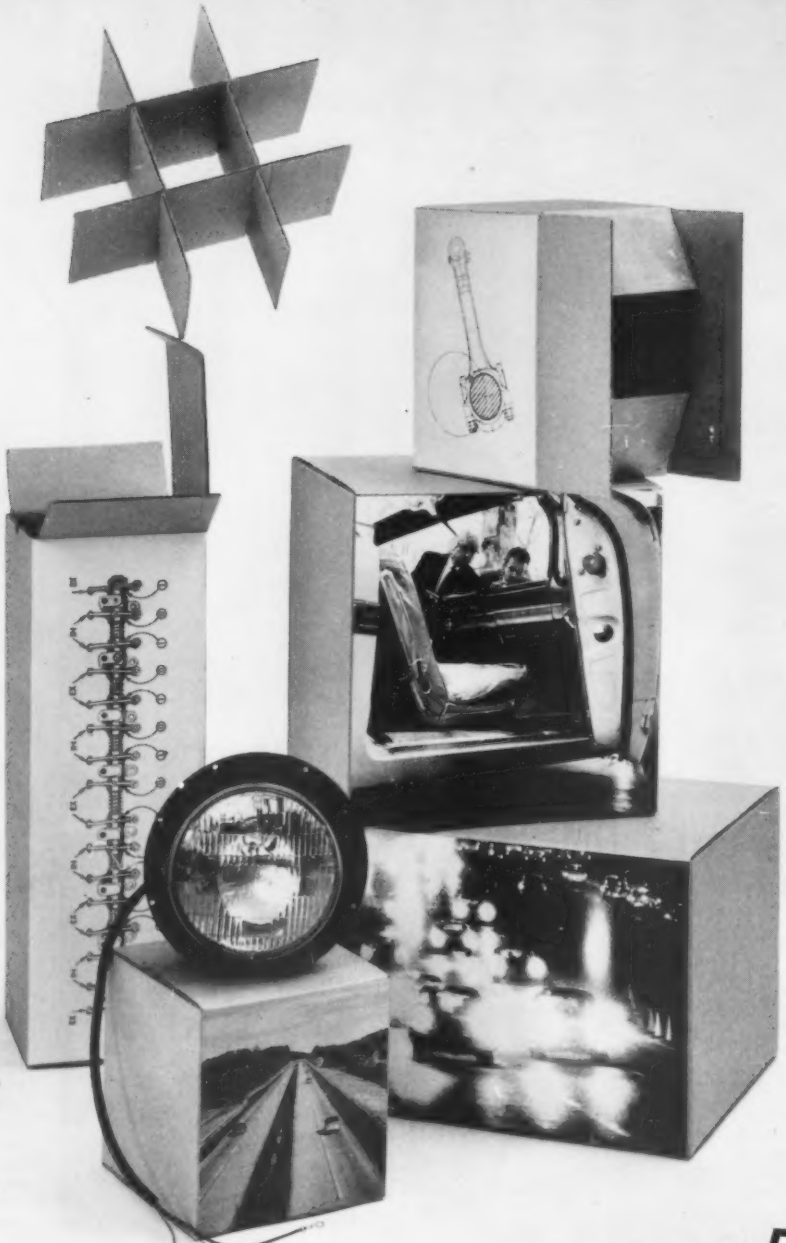
Fasten it better and faster with

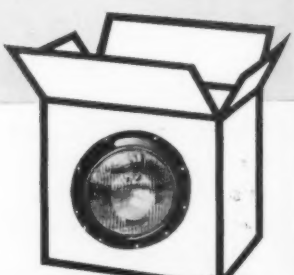
BOSTITCH®
STAPLERS AND STAPLES

872 Briggs Drive, East Greenwich, Rhode Island



a cosmetics manufacturer did ... And box assembly time was cut in half. Result: four-tenths of a cent a unit was saved. Only 2 staples are required for most of the 28 different size boxes this manufacturer uses.





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West Virginia Pulp and Paper

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17 Plants • 42 Sales Offices • Sandusky, Ohio

Some physiological and pathological problems to consider for prolonged fruit life

Choosing the right package for Fresh Fruit

By Noel F. Sommer, *Assistant Pomologist,*
and Donald A. Luvisi, *Research Assistant,*
University of California,
Davis, California

To plan the best package for a given fresh fruit, knowledge of the physiology and pathology of the species is important. Explaining some of the chemistry of living fruit, and the decay resulting from microorganisms, the authors discuss the effects—"modifying" the atmosphere, preventing moisture loss, protecting the fruit from physical damage—packaging can have on prolonging fruit life.

In the packaging of living fruits, special attention must be given to the physiological and pathological problems created by the unnatural environment of the container. Neglecting these problems may hasten deterioration, but soundly planned packaging may prolong fruit life. Planning can be sound only if the needs of the fruit species are carefully considered.

As might be expected, the longer the fruit is in the package the greater the effect of the package on the physiology and pathology of the fruit. Some packages merely provide convenient and attractive units for individual purchases; others must hold fruit for weeks or months in low-temperature storage followed by extended transport before marketing. Conditions approaching the latter are considered here.

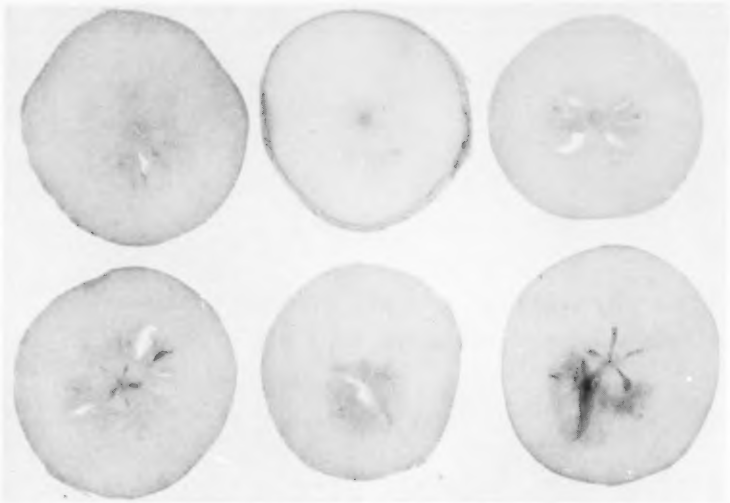
Package characteristics most likely to affect the length of postharvest fruit life may be grouped as follows:

1. Mechanical characteristics.
2. Thermal conductivity.
3. Permeation by gases.

Fruit deterioration may result from natural processes (physiological), by decay organisms (pathological), or by physical damage. How package characteristics influence the various types of fruit deterioration is shown in various studies reviewed herein.

PHYSIOLOGICAL DETERIORATION

The natural deterioration of a fruit starts when it is picked. Until then, the fruit receives a constant supply of water, minerals, and carbohydrates from an elaborate conducting system. Removing the fruit from the parent plant doesn't stop natural processes such as water loss and the use of carbohydrates by the living cells. Thus, the problem is to conserve water



1 RESPIRATION RATE OF FRUITS is slower in gas-tight container—since CO_2 level increases as O_2 level decreases. However very high levels of CO_2 injure fruit. Note cavities and discolored tissues of Bartlett pears after 3 mo. storage at 32°F. and 7 per cent CO_2.

and carbohydrates without disrupting vital processes.

All living plant and animal cells respire, a process which consumes carbohydrates, absorbs oxygen, evolves carbon dioxide and water, and liberates energy. While analogous to the "breathing" of higher animals, plants never actually "breathe." Consequently, "respiration" in plants refers primarily to the oxidation of foods in living cells, with resulting release of energy. Some of the energy released is used in vital chemical processes in the fruit cells, the rest is lost as heat.

Assuming that a hexose sugar is the substrate, the summary chemical equation for aerobic respiration is:

$$C_6H_{12}O_6 + 6O_2 \longrightarrow$$

$$6CO_2 + 6H_2O + 673 \text{ kg.-cal.}$$

Hexose is not oxidized in a single step, as suggested by the equation, but by a complicated series of intermediate steps.

To allow time for transit and marketing, fruits are normally picked before they reach eating ripeness. Thus, all or part of the ripening process must take place within the package. Ripening is accompanied by softening of tissue, which results in a more fragile product, and by changes in color, odor, and flavor. Speed of ripening commonly determines the length of fruit life after harvest.

Slow Respiration Desirable

High respiration rates are usually associated with rapid ripening and a short postharvest life. Thus, *slow* respiration is desired. This can be achieved by lowering the temperature. A further reduction in the respiration rate can be achieved by modifying the atmosphere to a low concentration of oxygen, a high concentration of carbon dioxide, or both.

Within the range of temperatures encountered in handling and transit, the respiration rate is about halved by each 10°C. decrease in temperature. Consequently, postharvest life is longest when fruit is held at the lowest temperature possible without freezing the product—except that some fruits require a somewhat higher temperature to prevent low-temperature disorders *(4)*.

For example, the respiration rate or rate of living of sweet cherries has been shown in certain tests to be about eight times as high at 60°F. as at 32°F. Thus, the cherries might last about eight times as long at the lower temperature *(18)*. Furthermore, cooling should promptly follow harvest to extend the storage of the fruit by conserving the substrate that supplies energy for vital processes. Tests with sweet cherries show that immediate storage at 32°F. results in 15 days of effective storage life, whereas a delay in cooling for 30 hr. reduces holding time to 10 days *(13)*.

Fruit Gives Off CO_2

The respiration rate can be slowed further by a low level of oxygen and an accumulation of carbon dioxide *(4, 6, 7, 11)*. These may be established by storing the fruit in gas-tight rooms and permitting the respiring fruit to consume oxygen and build up the carbon dioxide level.

The storage life of certain varieties of apples and pears can thus be extended months beyond the life of similar fruit in air at the same temperature *(10)*. In this way the carbon dioxide level is commonly elevated from the normal

TABLE I

Atmosphere Modification Within Packages Containing Golden Delicious Apples*

Treatment	Average Concentration On Date Indicated (%†)					
	Oct. 24	Nov. 5	Nov. 25	Dec. 17	Jan. 31	Mar. 28
			A. Carbon Dioxide Levels			
Sealed	6.7	5.8	4.7	5.6	4.4	4.4
One vent	4.8	3.8	3.5	3.7	3.4	3.1
Two vents	3.8	3.0	2.7	2.5	2.5	2.4
			B. Oxygen Levels			
Sealed	3.2		3.6		2.0	2.0
One vent	13.3	14.2	15.3		16.4	16.2
Two vents	15.2	15.4	17.3		18.0	18.0

*Stored at 32°F. in 0.0015-in. polyethylene liners within 1-bushel tray-packed boxes. Films were sealed or provided with 1 or 2 vents, ¼-in. in diameter.
†Average of four packages.

TABLE II

Atmosphere Modification Attained, And Quality Of Van Sweet Cherries, Within Low- And High-Density Sealed Polyethylene Package Liners*

Package No.	Film		Atmosphere (%)				Weight Loss (%)	Remarks
	Thickness (mils)	Density	At 41°F.		At 68°F.			
			CO_2	O_2	CO_2	O_2		
1	1.3	0.916	9.5	1.0	24.0	0.8	0.6	Fruit turgid, stems green
2	1.3	0.916	8.5	10.5	21.5	0.8	0.6	Fruit turgid, stems green
3	1.3	0.916	10.0	1.0	23.2	0.7	0.6	Fruit turgid, stems green
4	1.4	0.924	10.0	1.5	29.0	0.7	0.6	Fruit turgid, stems green
5	1.4	0.924	8.0	2.0	24.0	1.6	0.4	Fruit turgid, stems green
6	1.4	0.924	10.5	4.5	25.8	0.6	0.4	Fruit turgid, stems green
7	No film						3.5	Fruit shriveled, stems brown
8	No film						4.0	Fruit shriveled, stems brown
9	No film						3.7	Fruit shriveled, stems brown

*Van sweet cherries, stored in lugs 11½x14¼x3¾ in., were held 7 days at 41°F. and 2 days at 68°F.

0.03 per cent to 4 or 6 per cent, and oxygen is reduced from the normal 20.93 to 2 or 1 per cent.

Must Control CO_2 Level

There is a point beyond which respiration cannot be slowed without the development of undesirable characteristics. These may include the development of alcoholic flavors and the browning of internal tissue, with the occasional development of large cavities in the flesh.

Injury from high levels of carbon dioxide is particularly common. (See Fig. 1.) The development of symptoms is affected by gas concentration and length of exposure. Excessive carbon dioxide levels may sometimes be used for a small portion of the normal storage period without injury. In controlled atmosphere storage rooms, harmful atmosphere levels are prevented by frequent analysis and adjustment of carbon dioxide and oxygen content.

Package Aids Equilibrium

Atmospheres can be modified by packing warm fruit within a semipermeable film liner *(5, 11)*. Fruit respiration consumes much of the oxygen within the package and builds up the level of carbon dioxide. Fruit cooling, accumulation of carbon dioxide, and depletion of oxygen slow respiration. Eventually an equilibrium is reached: oxygen consumption and carbon dioxide production are balanced by the permeation of these gases through the film.

However, if the container is warmed, carbon dioxide production and oxygen consumption increase along with a modest change in the permeation rate of the film to result in the establishment of an equilibrium at the new temperature. Modification at the higher temperature is usually more severe. With any given fruit species, the atmosphere achieved will thus depend on the temperature, the permeation properties of the film, and the relation of film surface area to fruit bulk.

Low Moisture Loss Important

In addition to modifying oxygen and carbon dioxide, semipermeable films may also provide a barrier against rapid passage of water vapor. Reduced evaporation of moisture from fruits and stems is frequently the greatest quality-conserving benefit of film *(16)*.

For fresh fruit, the desired film should be relatively impermeable to water vapor but highly permeable to oxygen and carbon dioxide. This contrasts with many other film uses, in which high gas permeation is objectionable. Polyethylene, particularly thin film of low density, has properties approaching these requirements.

Need For Vent Holes

However, polyethylene is often not sufficiently permeable to gases and must be provided with vent holes. Such ventilated film efficiently reduces fruit moisture loss and may elevate carbon dioxide, but a worthwhile oxygen reduction is not possible.

In tests with Golden Delicious apples, 0.0015-in. high-density polyethylene was used. In storage tests at 32°F. and 90-per cent R.H. from October to late March, the sealed film generally maintained very satisfactory carbon dioxide and oxygen levels. (See Table I.) Because of increased respiration, however, it would appear likely

TABLE III

Weight Loss Of Peaches And Nectarines As Influenced By Polyethylene Film Liners

Variety	Holding Period (days)		Weight Loss (% of original*)	
	At 41°F.	At 68°F.	No Film Liners	With Film Liners
Peach Varieties:				
July Elberta	11	2	4.1	0.3
Fay Elberta	11	2	6.7	0.4
Nectarine Varieties:				
Early Le Grand	9	0	4.5	0.4
Freedom	5	3	8.7	0.5
Late Le Grand	5	2	4.9	0.2

*Differences between fruit in film liners and similar fruit not in liners were, in all tests, significant at the 1-per cent level.

TABLE IV

Effect Of Elevated Carbon Dioxide Atmospheres On Rate Of Decay By Selected Fungi*

Fruit Variety	Decay Organism	Carbon Dioxide (%)	Lesion Diameter† (mm.)
Katie peach	*Monilinia fructicola*	Air	48
		1.2	47
		2.6	45
		4.8	43
		9.8	36
		17.0	28
Wilbur peach	*Rhizopus stolonifer*	Air	67
		1.2	63
		2.6	55
		4.9	54
		9.8	55
		17.0	29
Bartlett pear	*Penicillium expansum*	Air	22
		1.2	22
		4.9	19
		9.8	16
		17.0	13
Bartlett pear	*Botrytis cinerea*	Air	35
		1.2	35
		2.6	35
		4.9	32
		9.8	31
		17.0	22

*Data obtained after 4 days at 68°F.
†Average diameters of 40 lesions.

that modification would become extreme when removed to room temperature.

Packages with one or two ventilation holes of ¼-in. diameter likewise maintained a desirable carbon dioxide level. Concentration of oxygen, however, was too high for effective respiration reduction. Generally, the oxygen level must be 5 per cent or less to cause a reduction in respiration which would tend to prolong postharvest fruit life.

At the end of the storage period, apples within sealed polyethylene film were turgid and the color about the same as at harvest. Control fruits not held in polyethylene were badly shriveled and a deep yellow. Fruits within vented polyethylene liners were turgid but of intermediate color.

In tests with sweet cherries, the variety Van was placed in lugs 11½x14½x3¾ in., containing about 15 lb. of fruit. A simulated transit period of seven days at 41°F. was followed by a two-day simulated marketing period at 68°F. Carbon dioxide levels mounted above 20 per cent at the warm temperature, but no carbon dioxide injury was observed. (See Table II.) This no doubt reflects a tolerance of this species to carbon dioxide *(7)*.

Film Controls Weight Loss

At the end of the test period, all fruits within polyethylene liners were turgid, and the stems were bright green and still firmly attached to the fruit. Weight losses were less than 1 per cent. Fruit similarly treated, but not in polyethylene, suffered an average weight loss of 3.4 per cent and appeared shriveled. The stems were brown and easily detached.

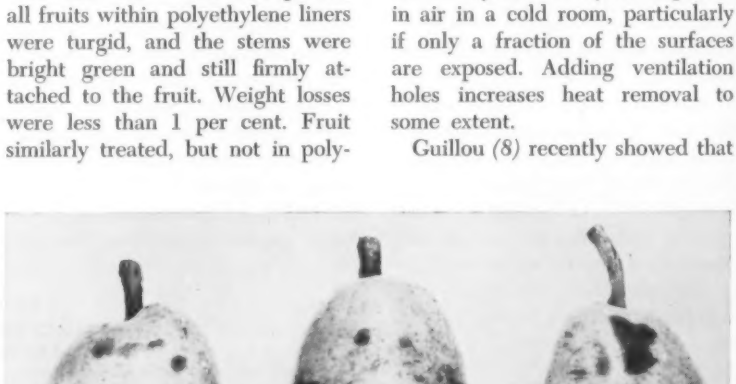
Carbon dioxide and oxygen levels modified in tests appear to be of little benefit to peaches and nectarines. Moisture loss, however, is a serious problem that can be effectively controlled with vented polyethylene film liners. (See Table III.) Peaches and nectarines held without film liners for a simulated transit and holding period of 7 to 13 days were shriveled. Furthermore, weight losses were greater than 4 per cent, whereas fruit in polyethylene had less than 1 per cent weight loss.

Look At Thermal Conductivity

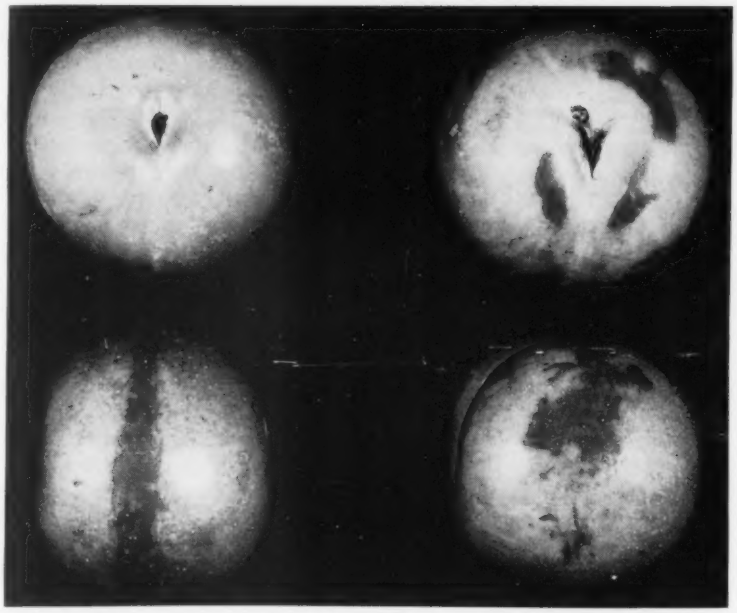
Fruits are commonly packaged before cooling. Consequently, the thermal conductivity of the packages and packing materials must be considered. The cooling method may determine the packaging materials and vice versa. If packaged fruits are cooled by contact with ice water (hydrocooling), the packaging materials must withstand soaking.

Corrugated fibreboard containers usually cool slowly when placed in air in a cold room, particularly if only a fraction of the surfaces are exposed. Adding ventilation holes increases heat removal to some extent.

Guillou *(8)* recently showed that



2 SURFACE ABRASION, IMPACT BRUISES are important injuries. Although they affect only epidermis and few underlying cells, most fruits turn brown shortly after damage—from enzymatic oxidation. Note vibration injury to Bartlett pears after cross-country rail shipment.



3 VIBRATION INJURY to Santa Rosa plums after transcontinental rail shipment. This type injury can hasten ripening and reduce postharvest life. Cold fruits are less subject to vibration injury than warm fruits, but cold fruits are more subject to impact bruises.

fruit in such packages can be cooled rapidly if air is made to flow through the containers instead of around them. Providing slots (vents) in the sides of cases and stacking them tightly to form partitions forces the cool air to flow through the vents and among the packaged fruits with a small difference in static head.

PATHOLOGICAL DETERIORATION

The decay of fruits differs from the spoilage of food products in that living tissue resists the growth of most microorganisms. Microorganisms are further limited by the mechanical barrier provided by the "skin" of fruits. Few organisms can penetrate the layer of chemically inert material (cuticle) that surrounds the fruit. Consequently, of the myriads of microorganisms present, only a few decay fruits.

Much of the decay loss of California deciduous fruit is caused by species of only four genera of fungi. These are *Rhizopus, Botrytis, Monilinia,* and *Penicillium.* Other fungi may, on occasion, present serious problems. Bacteria-incited decays are more common postharvest problems of vegetables.

Steps In Decay Process

The decay process might typically be divided into the following steps, based on the activity of the inciting organisms:

1. Spore germination and penetration of the fruit.
2. Colonization and growth within the fruit.
3. Spore production and dissemination of spores to other fruit.

Spores of microscopic size landing on a fruit, if temperature and humidity conditions are satisfactory, will germinate within a few hours by sending out a small structure called a germ tube. Some species are capable of forming on the underside of the germ tube a minute construction called an infection peg, which is capable of penetrating the fruit cuticle by mechanical pressure. No cuticle-dissolving enzymes are known in the fungi.

Once inside the fruit, the infection peg regains the normal diameter of the mycelium—the mold strands. In time, fungal structures emerge from the fruit to bear spores which are disseminated by air or water.

Wounds Are Big Problem

Natural openings in the fruit, such as stomata and lenticels, provide an avenue of invasion that does not require penetration of the cuticle. The most common entrance for postharvest decay organisms, however, is wounds. This is true even with fungi capable of penetrating the cuticle.

Bruises, stem punctures, cuts, limb-rubbed areas, and abrasions are common wounds leading to entrance of postharvest decay organisms. Bruises and abrasions of deciduous fruits, resulting from improper packaging, are frequently invaded by *Penicillium expansum*

4 MOST DECAY FUNGI infect fruit damaged by vibration. Note invasion of Late Le Grand nectarine by *Penicillium expansum* (Link) Thom. Impact bruises remain sterile unless surface tissues are injured.

(Link) Thom or *Botrytis cinerea* Pers. in cold storage or transit.

Spores of most fruit-decay fungi require high humidity for a number of hours before germination. Some can germinate at lower humidities, but germination is most rapid at relative humidities above 90 per cent or in free water *(1)*. The atmosphere at the surface of the fruit may be too dry, but a fresh wound will provide the moist environment for spore germination.

Use Fungicide In Package

By film liners, the humid atmosphere maintained around fruit to control shrinkage also improves the

environment for spore germination and infection. Consequently, it is sometimes necessary to treat the fruit with a fungicide before such packaging.

The efficiency of certain fungicidal applications in controlling postharvest infections of peaches and nectarines in polyethylene has been determined by Sommer and Mitchell *(16)*, and Luvisi and Sommer *(11)*. Infections of Rio Oso Gem peaches by *Monilinia fructicola* (Wint.) Honey were reduced to near zero by sodium orthophenylphenate. Over 90 per cent of the flesh of untreated fruit was invaded. Dehydroacetic acid has also proved effective against the fungus and appears efficient against *Rhizopus Stolonifer* (Ehr. ex Fr.) Vuill.

Effect Of Modified Atmosphere

The growth and spore germination of decay-inciting fungi may be slowed by low temperatures and modified atmospheres. The optimum temperature for infection and growth of fungi varies with the species, but is optimum for most fungi at about 75°F. Growth is invariably slow below 40°F. Even so, some decay of deciduous fruits may occur at low temperatures. For example, apples, pears, and grapes stored for long periods at 32°F. may suffer decay from *B. cinera* and *P. expansum*, which are capable of some growth at low temperatures.

In addition, spore germination may be inhibited by pH changes resulting from high carbon dioxide levels. Moisture absorbed by the spore may be acid as a result of dissolved carbon dioxide. The high acid level may prevent normal germination and growth under otherwise ideal environmental conditions *(2)*. Data in Table IV show a marked reduction in decay by common fungi, but generally at carbon dioxide levels injurious to fruit.

All fungi are believed to be strictly aerobic, though some are capable of considerable growth at very low oxygen tensions. All species require some oxygen and none have been reported to grow better at low than at atmospheric oxygen. Sugars may be fermented anaerobically, but this ability is evidently not related to the ability of the fungus to grow *(2)*.

PHYSICAL DAMAGE

Perhaps the most important function of fruit packages is the prevention of damage which not only directly alters appearance and quality, but also hastens physiological and pathological deterioration. Postharvest handling of fresh fruits subjects them to a great variety of damaging vibrations and impacts. The resulting injuries and their causes are frequently obvious; sometimes they are obscure.

Abrasion And Bruises

The two important types of injury are surface abrasion and impact bruises. Abrasion may result from fruits rolling against the container, grading belts, or each other. Results are similar when fruits jiggle or roll from transit vibrations. The latter is a particularly important consideration with Western fruit, which may undergo a transcontinental rail trip of eight or more days to reach some markets. (See Figs. 2 and 3.)

At time of shipping, fruits are frequently firm, and vibration injury commonly affects only the epidermis and a few underlying cell layers. Very soon, the injured areas of most fruits turn brown as a result of the enzymatic oxidation of cell constituents. Similar fruits, receiving impacts corresponding to 24- or 36-in. drops, may receive injury to flesh tissue, evident when they are peeled, but not involving surface layers. At first, impact bruises merely appear water-soaked, but in time, all such areas become brown. As fruits soften, either vibrations or impacts may cause general injury to both flesh and epidermis *(14, 15)*.

Vibration injury has been noted to hasten ripening and reduce postharvest fruit life. Increased respiration can result even from vibrations that do not cause extensive visible injury *(17)*. Similar results have been obtained with bruises *(3)*. In addition, vibration injury serves as an infection court for most decay fungi. (See Fig. 4.) Impact bruises remain sterile unless surface tissues are injured.

Tight Packing Necessary

Vibrations are transmitted to the load from irregularities in the roadbed or wheels. Impact bruises may occur at any time during and after harvest if the fruit is dropped more than a few inches. Further impact injury is possible if the rail cars are subjected to severe longitudinal impacts, incurred in starting or stopping, or from slack in the coupling system as long trains go up or down grades. The only

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Donald A. Luvisi is a graduate of University of California and received an M.S. in horticulture in 1960. Since 1958 he has been engaged in graduate research in fruit packaging, handling and transportation. Mr. Luvisi is a member of American Society for Horticultural Science.

satisfactory method of preventing transit injury during transcontinental rail trips appears to be by packing the fruit tightly within containers to prevent fruit movement.

Fruit temperatures influence the amount of transit damage. Cold fruits are less subject to vibration injury than warm fruits, but cold fruits are more subject to impact bruises *(17)*. When vibrations are severe, as in rail transit, less injury can be expected if fruit is loaded cold. Nevertheless, injury occurs regardless of temperature if fruits are not held tightly in place.

The irregularities of size and shape of fruits make tight packaging difficult. It has been accomplished by overfilling the package so that lid, sides, and bottom bulge when lidded. An alternative method provides for the placing of carefully sized fruits into a container with considerable lateral pressure against container sides.

Further tightness may be achieved from tissue paper wraps around and between fruits. Such packaging is a hand operation. Mechanization requires the elimination of hand-placed tissue-wraps. Furthermore, it will likely involve a change from nailed wooden boxes to fibreboard boxes.

Lab Tests For Vibration Injury

For packaging studies, transit vibration injury was produced in the laboratory by a vibrator consisting of a spring-mounted table carrying an electric motor and a system of eccentric weights on a counter-shaft *(9)*. Rotation of weights and table about their common center of gravity resulted from the use of soft springs. The amplitudes of vibrations could be adjusted by altering the mass of the weights and frequency was determined by the combination of V-belt pulleys used in driving the counter-shaft. The stroke and acceleration were standardized by the MB Manufacturing Co. Model M-3 vibration meter.

Vibrations of rail cars are complex, with a variety of overlapping frequencies *(12)*. Furthermore, the individual car vibrations are apt to vary with the condition of the roadbed, the car, or its position in the train. Consequently, most tests were conducted at amplitudes and frequencies that produce injuries similar to those observed in fruit after a transcontinental rail trip. Most tests were made with vibrations having a ¼-in. stroke at 510 cycles/min. This produced slightly more than a 1-G force. A test period of 90 min. was used with packed fruit, while 30 min. was sufficient for loose fruit.

Test Results

Intensity of injury was scored on a scale of 0–5, from almost no injury to nearly complete surface abrasion. Necessarily, this rating measures both intensity of injury and the proportion of surface injured. Data represented the average of all fruits in the packages tested.

In a series of tests, Bartlett pears commercially place-packed in standard wooden boxes had an injury score of 0.5 to 1.2. Fruit jumbled loosely in fibreboard boxes invariably scored between 2.3 and 3.0. A protective coating of wax on the fruit actually increased injury to a rating of 4.0; the slick surface probably allowed more movement.

Fruits wrapped in tissue paper but otherwise loose in boxes scored 1.3. Loose shredded newsprint or shredded polyethylene film between fruits resulted in average scores of 1.1 to 2.2.

Field And Lab Results Agree

The generally greater injury in the top layers of loose fruit suggested padding over the top layer. This proved beneficial. Subsequent tests revealed that fruit mechanically filled in a telescope box will have a damage score below 0.5, if certain procedures are followed. First, the box body must be slightly overfilled. Excelsior or a similar pad is placed over the fruit which is settled in place by a brief vibration. Then the lid is closed with sufficient force (3 to 4 lb./sq. in.) to cause a slight bulge and is stapled in place. Over 30 test cars so packed and shipped from California to the Eastern seaboard have proved the correctness of the laboratory results.

CONCLUSIONS

Packages for deciduous fruit shipping should be designed to protect the contents from damaging impacts and vibrations. Transit injury not only directly affects fruit condition but hastens other deterioration as well. Respiration rates of fruit tissue are increased by injury while affected surface tissue may serve as the entryway for fruit decay fungi.

Excessive water loss results in unattractive, shriveled fruits. Furthermore, the less turgid condition of the fruit may permit a loosening of the contents to result in transit vibration injury. Water-vapor barriers, such as vented polyethylene liners, prevent shrivel but may increase the decay problem. The high humidity conditions within polyethylene liners favor fungal spore germination.

The modified atmospheres sometimes obtained within packages may slow ripening and prolong postharvest life of some fruit species while slowing the growth of decay organisms. However, some fruit species do not respond favorably to modified atmospheres and excessive modification is nearly always deleterious.

Packages for deciduous fruit shipment must be designed to meet the specific requirements of the fruit contained. The relative importance of various package characteristics depends upon the fruit species, the decay organisms involved, and the rigors of handling and transit.

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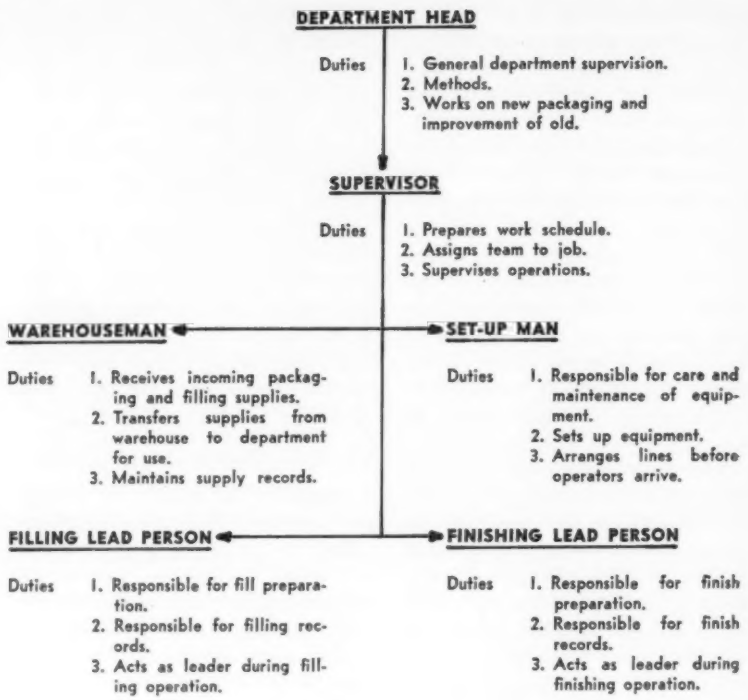
(Continued on Page 116)

1 FILL AND FINISH DEPARTMENT organization at Corn States. Centralization of filling and finishing operations has helped company reduce production costs, upgrade packaging quality—through adoption of better methods and improved equipment.



By Carl Krabbe, *Department Head, Fill and Finish Department, Corn States Laboratories, Inc., Omaha*

Single, centralized department proves its worth

In every pharmaceutical and biological company, there comes a time when management must decide whether filling and finishing of product should take place in one centralized department or in the various production departments with each one doing it separately.

In some smaller companies in the pharmaceutical and biological fields, filling and finishing is an orphan operation that management considers secondary to production of the product. This is a fallacy, since, in almost all cases, a company is judged to a considerable degree by the container its product comes in—and the way it is labeled.

Concentrating its "fill and finish" operations (the name pharmaceutical firms frequently use for product packaging) in a single department pays off, asserts Mr. Krabbe. His views on how to (1) fit such a department into the company structure, and (2) coordinate its work with that of other departments should interest those concerned with the management of packaging. Point of special interest: calling in "reserve operators" for packaging lines.

The following set of circumstances existed in our company until August, 1958. The production division was broken down into four areas of concentration:

1. Serum and virus production, where antitoxins, serums, and hog cholera virus were manufactured.
2. Biological production, where bacterins and vaccines were produced.
3. Pharmaceutical production, where tablets, powders, parenterals, and other pharmaceutical products were manufactured.
4. Control department, where all of our products were tested, first in bulk containers and then in the final containers after filling.

Each of the manufacturing areas

was responsible for the filling and packaging of its own products.

Seek Better Operations

Early in 1958, our company decided it could attain savings by consolidating all filling and finishing into a single department. Our management predicated this decision on observations of our methods and equipment and on the knowledge that we could obtain more efficiency from operators performing these operations on a full-time basis.

We decided that we could form a centralized filling and finishing department by transferring to this new department the operators already performing this work in the various production departments on a part-time basis. We started the department with a department head, a group leader, a warehouseman, and seven operators.

Form Two Teams

We divided the seven operators into two teams: (1) A two-person team to handle filling and (2) a five-person team to handle packaging. At times we would have more than one team filling and doing no finishing, or two teams finishing and doing no filling, depending on how the work was scheduled. We have since expanded our work force, due to an increase in work load, but we still have the same basic team concept.

Carl F. Krabbe is a graduate of Creighton University with a B.S. degree; he has a major in biology and a minor in chemistry. He joined Corn States Laboratories in September, 1952. Mr. Krabbe took one year of graduate work in microbiology in 1956. He was a department head in biological production prior to organization of the fill and finish department which he now heads.

Using Reserve Operators

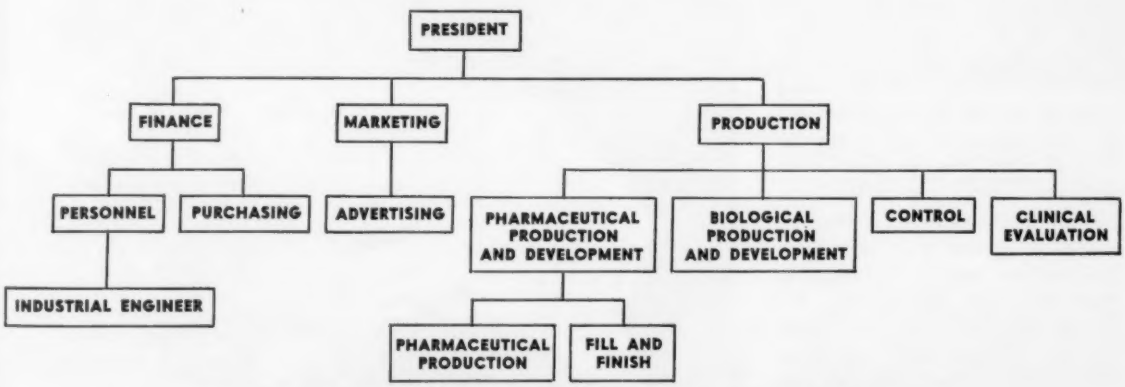
We also added what we call "reserve operators" to our department. These reserve operators are women living in the general vicinity of our plant who like to work on a part-time basis. If our work load increases sharply, but on a temporary basis, we call in our reserve operators. This enables us to maintain a level load per operator—keeping in mind that we want the operator output to increase with better methods.

A building, now known as Building 13, at our South Omaha serum plant, had just recently been renovated for pharmaceutical production. It was decided that this would be the home of the newly created filling and finishing department. A new cooler was constructed for this department to store (1) bulk refrigerated product received from the various production units, (2) filled product awaiting the labeling process, and (3) finished product not yet transferred to shipping.

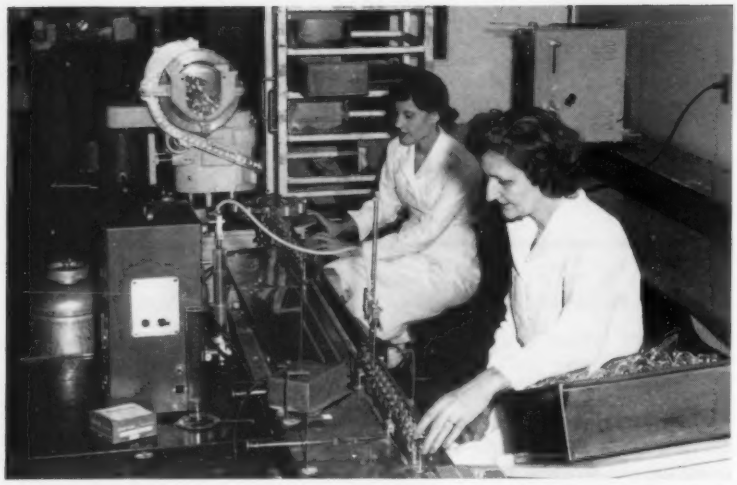
Control Work Flow

Our production control department regulates the flow of product in and out of the fill and finish department. The head of production control issues weekly request forms for product. These forms come out two weeks in advance, thus giving the head of production control time to discuss it with the fill and finish department head to determine the number of work hours available in the department. If production control requests more work than fill and finish can handle, the department heads decide how to reduce the load.

If the work load cannot be trimmed, we then call in our reserve operators. If the work load is too light, production control will advance the work. Once the work load is set, the production control department issues the orders for the transfer of bulk product to the fill and finish department. The supervisor of the fill and finish department arranges these requests



2 PART OF BASIC COMPANY ORGANIZATION, showing relationship of newly created fill and finish department to other departments involved in some way with packaging. Members of company's packaging committee come from some of departments shown.



NEW FILLING LINE. Before creation of the fill and finish department, each of Corn States Laboratories' manufacturing areas was responsible for filling and packaging its own products.

into a work schedule and then assigns the operators daily to the various filling and finishing operations.

When Team Moves Out

We have found over the last two years that at times it is more convenient to send a filling team to one of the manufacturing areas to fill a particular product than it is to transfer some product to our own department. When this is necessary, the team prepares its equipment in our area before taking it to the point of use.

Our table of organization for personnel is now as shown in Fig. 1.

We have found that our reserve-operator system gives us a good source of new employees in that we are already familiar with the operators and thus are not hiring someone of unknown abilities. All of our operators are company trained, and they progress from the fairly simple jobs to the complex machine operating tasks.

The equipment was taken from the various production areas to start the new department. We started with two New Jersey labelers, one Markem labler, one Markem printer, various table labelers, conveyor belts, and miscellaneous equipment for the finishing lines. Our filling equipment was originally semiautomatic filling machines. The labeling equipment has remained pretty much the same, but we have switched over to Filamatic filling equipment. We have modified some of this equipment in our own plant to make it fully automatic.

Use Of Committees

Our next step was to set up a packaging committee. This committee includes the fill and finish department head, pharmaceutical production manager, advertising manager, purchasing agent, production control, and our industrial engineer. It is the duty of this committee to recommend improvements in packaging of old products and to develop packaging for new products. This committee reports to the product addition and deletion committee which has the final say regarding changes in packaging.

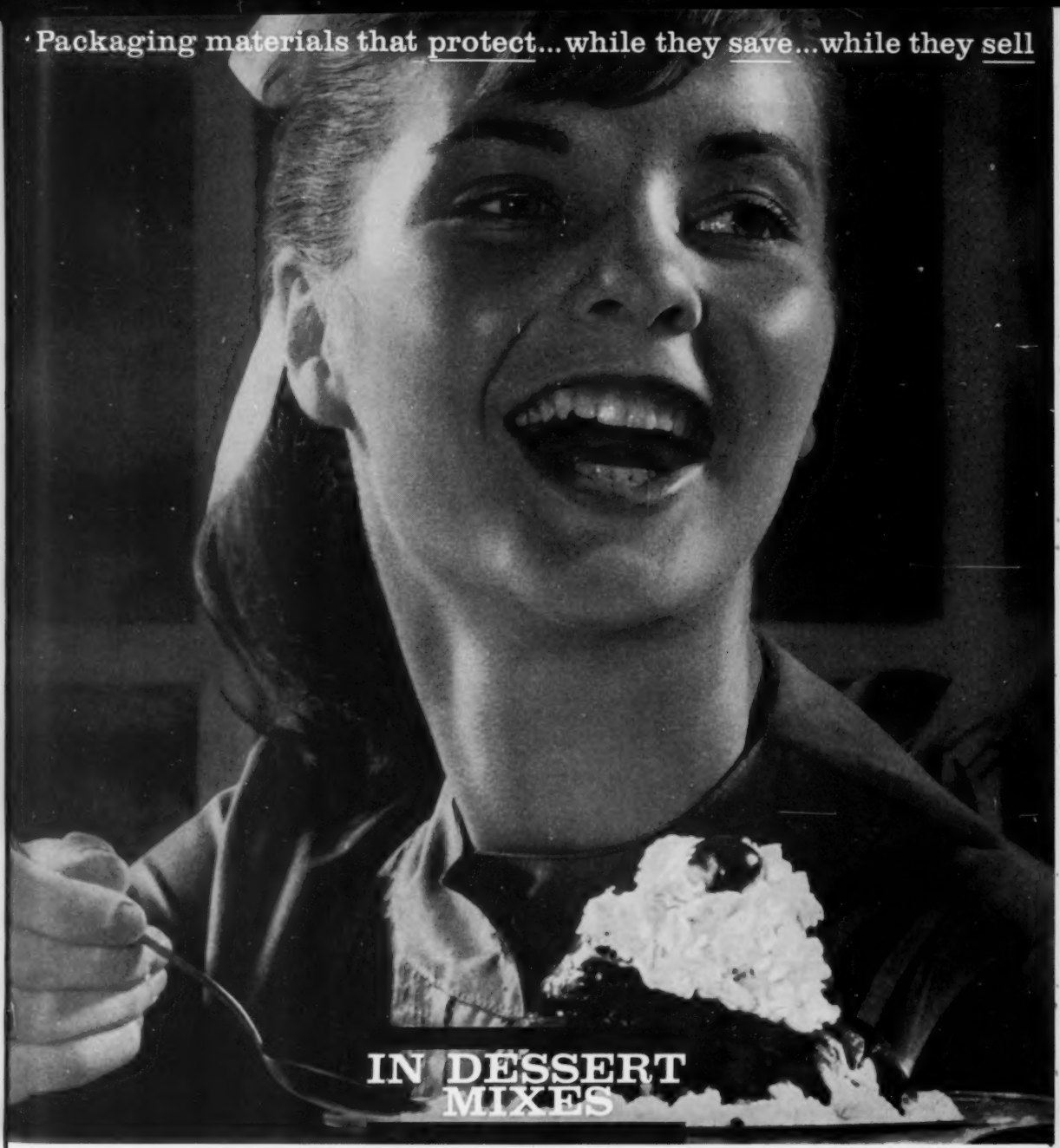
The product addition and deletion committee is made up of the following members: the president, marketing director and his assistants, production director, head of production control, purchasing agent, manager of biological production, manager of pharmaceutical production, and advertising manager.

With the establishment of the new fill and finish department, a methods committee was formed. This committee serves not only the fill and finish department but the whole production division. The methods committee is made up of the heads of the following departments: fill and finish, biological production, pharmaceutical production, serum and virus production. Also included are the production director, industrial engineer, and personnel manager.

(Continued on Page 116)

NEW FINISHING LINE. Consolidated fill and finish department was achieved by transferring operators already performing this work in the various production departments on a part-time basis to this new department. Also added—department head, group leader, warehouseman.

Packaging materials that protect... while they save... while they sell



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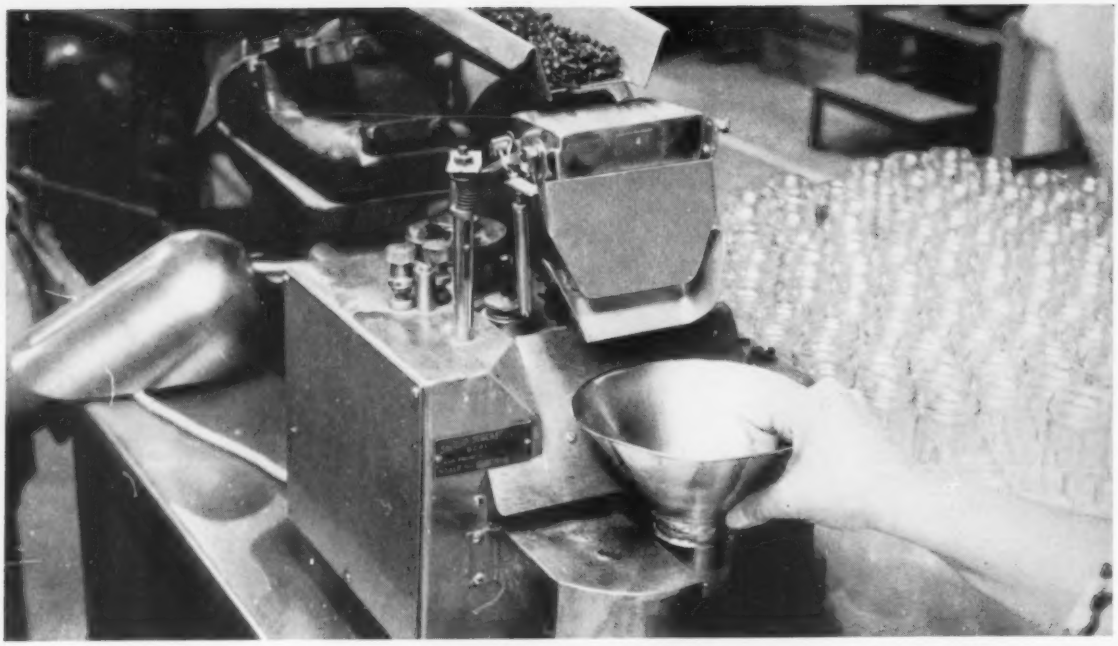


1 FUNNEL-MOUTHED JAR HOLDER serves as moving device, filling guide and equipment actuator. Operator places holder on jar (supply at right) and moves both into filling position—actuating fill. Device hits plate on filler, trips switch causing product to drop into jar.

Skilled hands, simple devices "ring" jars into place for filling

Major boosts in production from packaging lines do not always stem from high-speed, fully-mechanized equipment. The experience of Spice Islands Company shows how simple mechanical devices and manual working techniques combine with machinery to help bring about higher output. As seen here, the development of such a combination means flexibility, easy changeover, efficient filling.

By providing funnel-like "ring" devices for skilled manual operators to use in spotting jars for filling, Spice Islands Company, South San Francisco, California, combines manual techniques and mechanical aids to get peak production from filling line operations. This sort of combination has been one of the significant factors contributing to a 600 per cent hike in production in the last four years.

Company executives point out that they have insisted on product quality and package uniformity being maintained during the evolution of basic operations from manual to semi- and fully-automatic packaging. But the refinement and use of machinery has not crowded out simpler methods. Much credit goes to the combining of simple devices with manual techniques and units of packaging machinery. Officials note, for example, the effectiveness of these devices in their filling of products ranging from spices (such as curry and garlic powders, ground cinnamon and sage, and hickory salt) to chicken-seasoned stock base.

Need Run Flexibility

Packaging this wide a product range dictates ease of changeover

from one run to another as well as flexibility during operations. Spice Islands' funnel-like "ringer" for getting jars into place for filling illustrates how all this works. In this connection, at a typical line the work stations are located so that filling crew members face each other across single conveyor lines.

Moving through a Syntron vibrator, the product being filled during a given run goes into a small hopper on an Exact Weight scale. This unit weighs out a predetermined quantity and automatically shuts off the filling action of the vibrating mechanism.

"Ringing" Of Jars

While the weighing action takes place, an operator uses her positioning device (which fits over the neck of a jar) to "ring" and move each jar into place for filling. As the edge of her device hits a plate at the back of the filler, this action trips a Micro Switch. This causes the weighed-out quantity of spice or other product to drop into the waiting jar.

The action of moving a filled jar away from the filler causes the tripping of a second Micro Switch. This sets in motion the vibrating conveyor carrying another load of product to the hopper of the weighing scale.

Vibrating Down Contents

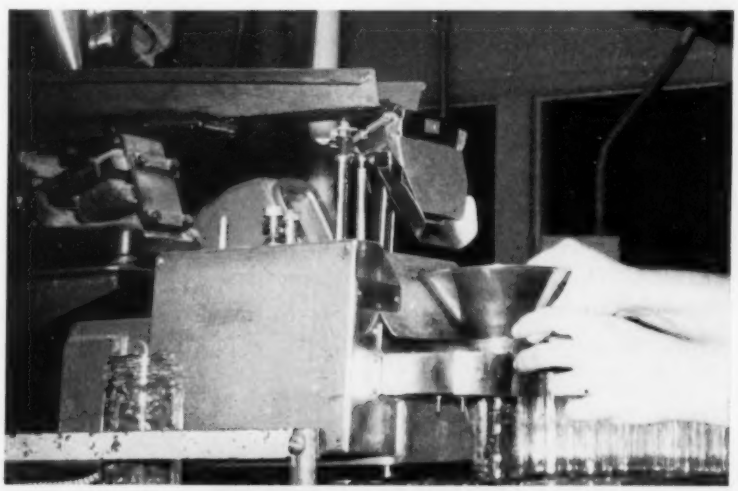
Meanwhile each filled jar goes to a wood-surfaced vibrating table which shakes down the contents of the jar. Next, each filled jar moves away on an outgoing conveyor carrying it to the capping and labeling stages of the packaging operation.

Reiterating their insistence on package quality control, Spice Islands' executives assert that their crews' use of these devices provides the product and package quality supervision and gives their lines flexibility and quick changeover without complex adjustment or presetting of equipment, thus minimizing downtime between runs. *(End)*

2 **PEAK EFFICIENCY** comes from having operators face each other at work stations. This lets them use common facilities, yet assures each has ample supply of jars within reach.

3 **PUSHING JAR** into position causes funnel to strike plate actuating switch. This makes weighed product drop into jar.

4 **ONCE JAR** gets fill of product, operator puts it on wood-surfaced vibrating table (left) to shake down contents.



5 **AS FILLED JAR** moves on vibrating table (left), operator repeats filling cycle using funnel to guide jar. After vibration, jars move on conveyor to capping and labeling.

SILICONE NEWS from Dow Corning

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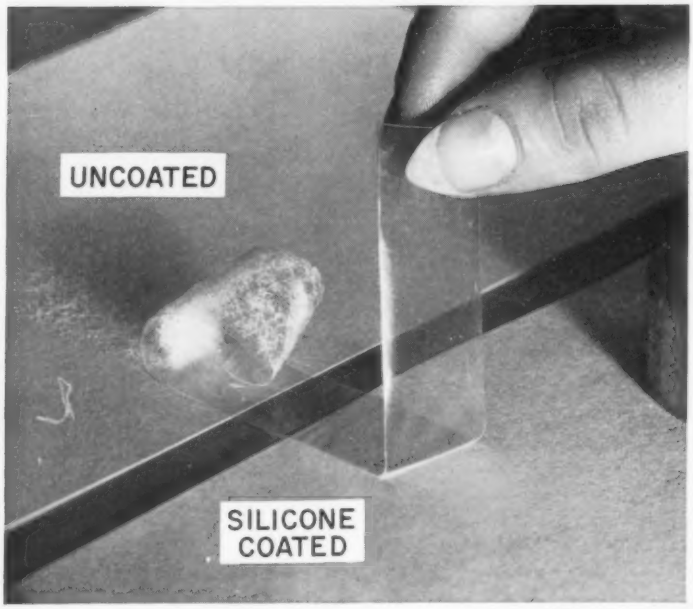

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1960 Professional Award winner:
Charles A. Lewis, director, containers and packaging division, U.S. Department of Commerce, Washington, D.C.

This year's Corporate Award winner:
Surgical products division of American Cyanamid Co., Danbury, Conn., for its sterile suture packaging

Technical Operations and Planning Board Award winner:
W. Earl Graham, Eastern sales manager, Clayton Corp., Westfield, N.J., for his paper on the packaging of aerosol foods

New president of PI:
Lawrence H. Zahn, director, purchasing and package development division, CIBA Pharmaceutical Products Inc., Summit, N.J.

New vice presidents:
Fred W. Langner, package coordinator, Socony Mobil Oil Co., Inc., New York, vice president and treasurer; Allyn C. Beardsell, director, new products division, The Mead Corp., Cincinnati, vice president-membership, and Iven G. Nichol, assistant sales manager, Morningstar-Paisley, Inc., New York, vice president-annual forum

Next year's forum:
October 18-20, 1961—Biltmore Hotel, New York

Some highlights of this year's PI forum

News of Packaging Institute's plan to stress individual, professional (rather than corporate) membership, highlighted its annual business meeting. "We are moving more and more toward a professional society," Charles W. Kaufman, director, research and development, National Dairy Products Corp., retiring PI president, declared, noting that "our main function" will be to provide a meeting place and serve as a sounding board for an expanding, developing professional membership.

Further, Packaging Institute is pledged to be national in character, scope and service, Mr. Kaufman asserted. He noted that besides meetings and programs which PI conducts around the country for its own members, it now sponsors packaging meetings for other organizations—for example, the Institute of Food Technologists.

Mr. Kaufman spiked rumors of any merger between PI and American Management Association; he pointed out that after considering such a merger, PI's directors voted against it.

PI's outgoing treasurer, Harold Mosedale, Jr., vice president-sales, Package Machinery Co., assured his audience that the group is in good financial condition. PI's expenditures thus far this year closely match the group's budget, and its treasury has a good cash surplus, he said.

Besides the group's 396 corporate members, it now has 782 individual members, including a gain for the year of 204 new professional members, according to L. H. Zahn, director, purchasing and package development div., CIBA Pharmaceutical Products, Inc., retiring membership chairman and newly elected president. Noting PI's plan to go "more and more professional" in character, Mr. Zahn explained that rather than offering memberships for sale, what the group really is selling is technical service.

Packaging Institute's 30 technical committees have some 450 participating members, reported Dr. L. E. Simerl, director, research and development, film div., Olin Mathieson Chemical Corp., out-going committee activities chairman. Reminding his audience that these committees are "made up of people who help each other" and share information, Dr. Simerl said PI hopes more people participate actively in committee work. He pointed out these committees function in many geographic locations.

Speaking along similar lines, Roger V. Wilson, general manager, customer research, Continental Can Co., Inc., chairman of PI's long range planning committee, asserted that "what we do for each other is the real key to the future of Packaging Institute." He said the group is planning more local-level programs in an effort to reach out and serve the packaging field all over the country.

Trends In Corrugated

Because package users hesitate paying a premium for a wet-strength box, development is slow with costs running as high as user standards, Charles O. Roth, Jr., regional product development engineer, Hinde & Dauch Div., West Virginia Pulp and Paper Co., told the corrugated and fibreboard packaging seminar. He predicted lower costs as techniques improve and user requirements for specific applications come down to reasonable levels.

Predicting better protective qualities through "judicious addition" of plastics and foils to papers, Allyn C. Beardsell, director, new products div., The Mead Corp., sees increased use of a very stiff

paperboard for corner posts—with resins added to the board furnish to make the resulting stock extremely rigid.

Pointing up needed improvements in corrugated, Carl J. Begemann, merchandising manager, A.S.R. Products Corp., cited (1) better basic color—bleached white on both sides at no increased cost, (2) development of edge compression to "hide" corrugations and remove rough, unsightly edges where ends or sides of flutes show, and (3) the smoothing out of board surfaces for better printing.

PI Hears About Research

Citing three areas of packaging which deserve more thinking and research, Peter B. Baker, senior staff member, Arthur D. Little, Inc., listed (1) packaging engineering—looking for engineering principles, (2) surface design, and (3) correlating the basic materials and requirements for a package. Reminding his audience of the problems of balancing packaging requirements of protection, merchandising and cost, Mr. Baker cited the value of contract research to study materials for small companies and to supplement the work of larger companies in their own research.

Drug Men Eye Plastics

Unit packages need better opening methods that do not destroy the unit pack or completely remove its reclosing feature, L. I. Volckening, president, Ivers-Lee Co., told PI's drug and pharmaceutical seminar. He foresees development of transparent plastic films as moistureproof as 0.001-in. aluminum foil; cheaper materials and higher packaging speeds, and coding of packages to identify sources of material components—to provide complete tracing back.

Noting the large growth of plastic thermoforming, Louis H. Pfohl, president, Plaxall, Inc., predicts more use of oriented polystyrene and polypropylene during the 60's—with improved techniques. Plastic packaging should replace many glass, foil and paper packages because of durability and nonbreakability, Carl B. Burnside, manager, package development department, Eli Lilly and Co., told his audience.

W. O. Bracken, plastic sales development, Hercules Powder Co., predicted blow-molded containers as large as 1,000 liters or 250 gal. He sees blow-molded products running to 350,000,000 lb. by 1965—up from 100,000,000 lb. now.

Some 98 per cent of all liquid detergents will probably be packaged in plastic by 1961, Dr. R. Vernon Jones, manager, technical service and development of plastics, Phillips Chemical Co., asserted. He views the expansion of medium- and high-density polyethylene by creating new markets, not by "stealing" from other areas.

Urging more development work to get better unscrambling, filling, capping and labeling of plastic bottles, Anthony Iannacone, technical director, Fluid Chemical Co., Inc., said that loose plastic in bottles, however, is the "most serious problem" to date. This condition is not only unattractive to consumers, but causes filling troubles by clogging filling nozzles, he explained, commenting further that another major difficulty is the capping of soft bottles because it is difficult to get a good grip without breaking bottle or marring its finish.

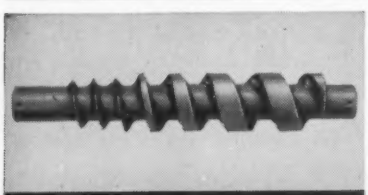
Stress cracking in plastic bottles is now largely alleviated by better materials and better bottle design, Leonard G. Phillipps, manager, pressed plastics div., Owens-Illinois Glass Co., told his audience. He noted that good design can counteract the collapsing of bottle sidewalls through O_2 absorption into product.

Noting the growth of pressurized packaging, Morris J. Root, technical director, G. Barr and Co., says that use of aluminum "may herald detergent-based products in aerosol-type packaging." He pointed out that plastic containers for aerosols are currently too expensive and asserted there would be much use for a low-cost plastic container.

Viewing The Future

Predicting packaging machinery of the 70's, Roger L. Putnam, Sr., chairman of the board, Package Machinery Co., foresees equipment to extrude a tube over continuously baked bread to permit cutting of this tube into groups of slices—thus having bread with no heels. He predicted further enrobing with liquid plastic, thus applying packaging in the same way candy makers coat bars with chocolate. As another innovation, he suggested pre-measured, compressed, dried products packaging on such enrobing equipment—for example, flour in enrobed packages of 1-cup units, to make measuring unnecessary.

Applying data processing equipment to packaging and inventory control, W. E. Wood, automation engineer, Processes Research Inc., suggested having a "punch tape plant" with satellite plants scattered around the country and with each plant's output adjusted for local sales. He said that computers



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KOPPERS PLASTICS

would make automatic adjustments and compensations as necessary to meet fluctuations in sales demands, thus holding warehouse space at a minimum.

A three-dimensional packaging line will become the best method of operating and servicing machinery, Leland R. Srigley, director, industrial engineering, Parke, Davis and Co., told his audience. While the concept of doing this at different vertical levels is not now economical, Mr. Srigley feels it will become so and that the trend of future packaging lines is getting away from two-dimensional (one-plane) layouts.

What's New With Closures

Screw capping speeds will move from the present 300/min. to 400-600/min. in the 60's, Edward L. Kuhn, president, Consolidated Packaging Machinery Corp., predicted. He noted that "how fast you can turn threaded caps down" limits present operations, and he predicted that 12- to 24-spindle cappers will replace the present 10-spindle cappers to reach these higher speeds. Current problems requiring attention include handling plastic bottles on older machinery, and feeding and orienting the new hinged, captive caps.

There is a trend toward caps applied by a fractional turn in contrast to the common full-threaded cap, Charles J. Jacobs, market director, overseas chemical div., W. R. Grace and Co., noted. He said that in England packagers use compound lined roll-on caps for beverages instead of the crown caps so common in the U.S. and elsewhere.

Food Packaging Reviewed

The most important factor in food aerosol growth is the formulation of the food itself, W. Earl Graham, Eastern sales manager, Clayton Corp., told those attending the food seminar. He urged the development of new food forms and more attention to current problems, such as the difficulty of getting speed and efficiency of gassing with soluble gases. Mr. Graham predicted the availability of a piston package—gassed through its bottom so that when a user actuates the package, the gas presses a piston to force product upward and out.

Better structural design of corrugated boxes is imperative in preventing the serious damage and package failures now occurring in refrigerated warehouses, Franklin D. Newell, Jr., manager, The Minneapolis Cold Storage, asserted. Noting the trend to single-story, high-ceiling warehouses, he said that package failures are delaying warehouse automation. He asked for more structural strength, more moisture-resistant material, less slippery surfaces, boxes of oblong shape, plus box size standardization.

Reviewing problems of meeting the requirements of the Food Additives Amendment, Robert N. Johnson, director, processed foods div., The Kroger Co., said that full information and letters of explanation are working out as well as continuing guarantees from suppliers of packaging materials. He urged keeping in close contact with suppliers and other sources of information.

Discussing the amendment from a supplier's viewpoint, Adolph Miller, director, research and development, Milprint, Inc., asserted that passing off responsibility to suppliers also gives them "power over your business" in that they decide what to make or not make. Because animal feeding tests take too long and cost too much, Milprint will probably abandon a new development rather than do those tests (usually extractability studies indicate a need for these). Having to prove the safety of a material acts as a real brake on packaging progress, Mr. Miller pointed out. One alternative for a supplier is to shift a new development from food to non-food packaging if the cost and time involved in meeting the amendment's requirements are too burdensome. *(End)*

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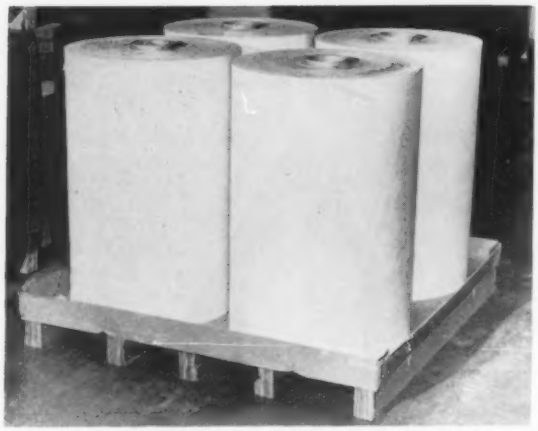
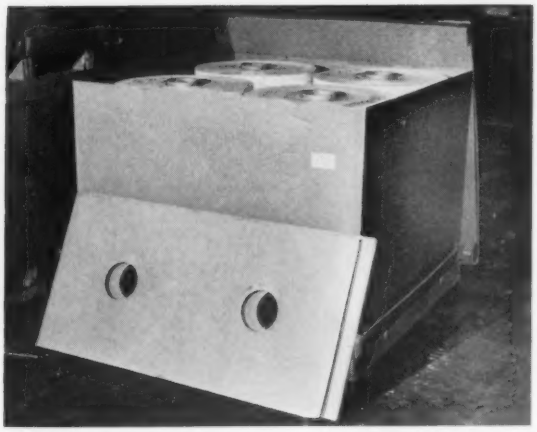


PACKAGING FOUR ROLLS of stencil tissue—a fragile hemp item —on expendable pallet was result of package re-design program.



FOCAL POINT of package design is 1-in. clearance around each roll, to protect against shock. Note fibre tubes protruding from cores.

Locking in package contents prevents damage, eases handling

By Jack Klecka,
Packaging Engineer,
A. B. Dick Company, Chicago

When investigation showed damage to fragile stencil tissue occurred in transit, A. B. Dick redesigned its package. Fitting die-cut inserts over the roll cores to leave air-space around the rolls and hold them in place within finished package solved the problem. This practical approach shows package development can be simple.

Tracking down hidden damage to our product led us to a package redesign. Our stencil tissue is an expensive, fragile item of hemp, and we were experiencing distortion of its fibers—invisible distortion. Not until the point of final inspection (after all processing and fabricating) did the damage show up. We were losing both product and our manufacturing effort.

As soon as we found the damage was taking place during transportation of these rolls between our source in the East and our plant at Niles, Illinois, we launched a package experimentation program. At that time, we were packaging individual rolls in corrugated containers of hexagonal shape, with the roll of tissue butted against the outside perimeter of the container walls.

At one time, we thought wirebound boxes would be our answer and we did a lot of trial-and-error work with them. We also tried wood crate packaging. Another alternative was developing an air space around each roll, but this cut down the outside diameter of the roll and meant that we were shipping that much air. This in turn, meant loss of the tissue that would have occupied that space.

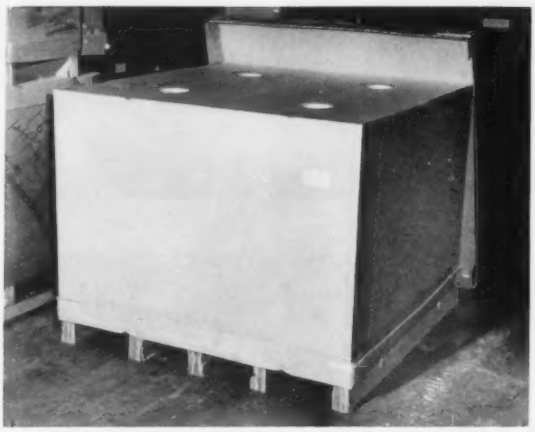
Ship Multiple Rolls

Eventually, we hit on the basic plan of our present package. We wanted to use larger rolls and ship them in multiples. Therefore, we started our design with the width of a freight car, i.e., 110 in. We saw we could have two palletized packages in this width with four rolls on each pallet.

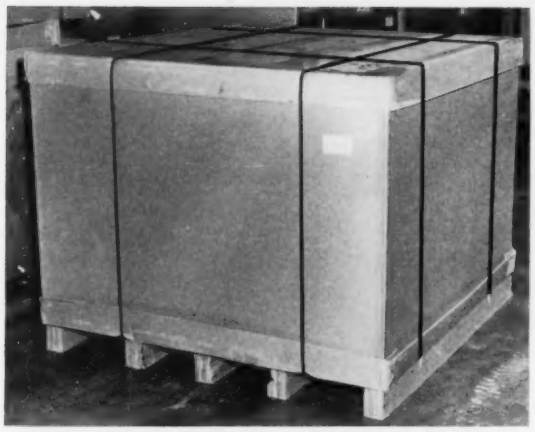
A focal point of our effort was putting a 1-in. clearance all the way around the outside diameter of each roll in the package. This gives enough air space and protection against shock without cutting down on roll capacity or occupying space unproductively.

Starting from the base of the pallet, we knew how many corrugated runners to have glued to the bottom of each pallet, that is, to the bottom pad. This is strictly an expendable package and pallet.

To cut down on damage during transit, we wanted to lock four rolls in place within each package. To do this, we used die-cut pads,



HOLES IN DIE-CUT PAD fit over fibre tubes protruding from cores. This prevents rolls from shifting, thus preventing any damage.



TOP CAP in place, steel strapping finishes package. Strapped cap makes tight package, keeping out dust which would damage product.

top and bottom, and provided holes through which chipboard tubes might go. Thus, through the core of each roll, there is a chipboard tube which serves as a pin. Because there is an opening in each of the die-cut pads, the pin or tube fits into this opening. As a result, a roll cannot shift, because, to do so, it must move its tube which, in turn, must move the entire die-cut and hence the walls of the packaged tube itself.

A description of how the crew members at our mill form this package shows how it works. First, they put four rolls in place on the top pad of the pallet, after which they put the top die-cut pad over the four rolls. Next, the four tubes, each one within the core of its roll, go into place and lock within the recesses in the die-cut.

Use Of Steel Strapping

After this, they put the outer sleeve in place, which serves as the package walls, going all the way around the four rolls and following the dimension of the pallet. Next, they put a top cap over the sleeve and top die-cut pad, and secure steel strapping around the cap. The die-cuts have enough strength to protect the rolls against the pressure of strapping.

There is another reason for steel strapping the top cap. Dusting is a problem with our stencil tissue. We need a tight package to keep out all dust and foreign particles. Strapping of the corrugated cap provides this protection.

After this, the entire package is steel strapped vertically to secure it to the pallet itself. Prior to this point, the package and rolls merely rest on the pallet. By the time the vertical strapping is done, the entire package is an intact unit containing four rolls.

Helping Our Suppliers

Our doing this package development work in our own plant for our supplier of rolls is in line with our normal practice. We frequently assist our suppliers in getting the kind of packaging that gives us the performance we need. Besides assuring us of packaging that meets our requirements, it also provides satisfactory unpackaging and use-out.

Our industrial engineering specialists devised work methods for this package at the same time we developed it from a structural and functional standpoint. Our standard practice is to use industrial engineering help in getting efficient work methods for all packaging.

Want Large Packages

Another practice we follow is making packages as large as possible, consistent with our ability to handle them in the plant. We could have made these roll packages still larger, but it would have been difficult to handle them on our lines at Niles.

Coordinating our package dimensions with those of a freight car has proved advantageous. It makes unnecessary the expensive use of blocking or dunnage. With our packages in place, we have just 2 in. of space to fill. This is no problem for us or our supplier. This package has proved so effective that we require no inner protection other than the corrugated die-cut and the chipboard tubes. There is no wrapping or other protective covering around the individual rolls of stencil tissue. Our supplier simply locks these rolls in place and they reach our plant intact, all tissue ready for use. *(End)*

Jack Klecka studied engineering at Illinois Institute of Technology. He has been associated with A. B. Dick Company for 28 years in various engineering capacities, and is currently its packaging engineer. Mr. Klecka is a member of the Society of Packaging and Handling Engineers.

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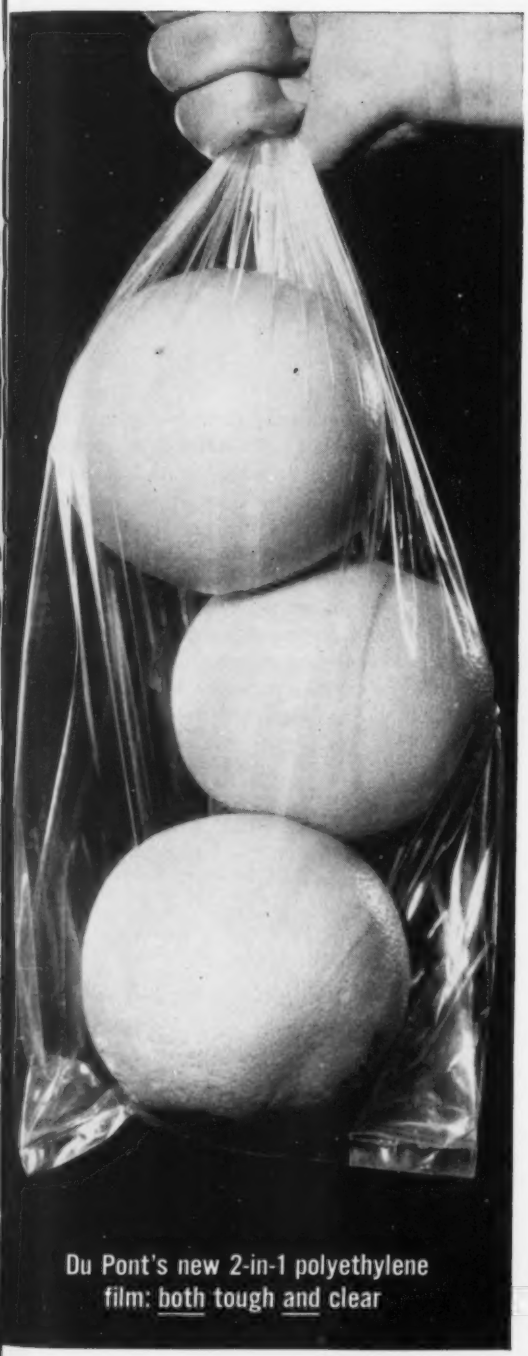
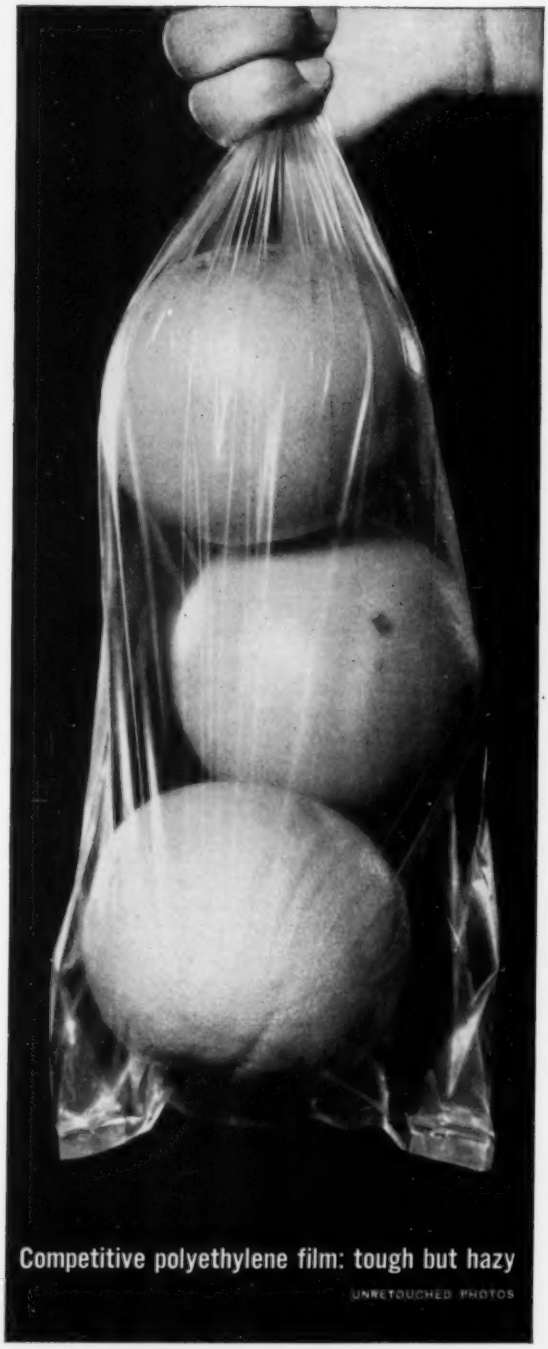


Du Pont's new 2-in-1 polyethylene film: both tough and clear



Competitive polyethylene film: tough but hazy

UNRETOUCHED PHOTOS

Part II—Transport test schedules, container testing and materials testing

LAB TESTS
predict package performance

By Frank A. Paine,
Senior Scientist, Packaging and Conversion Section, The Bowater Research and Development Company, Ltd., Northfleet, Kent, England

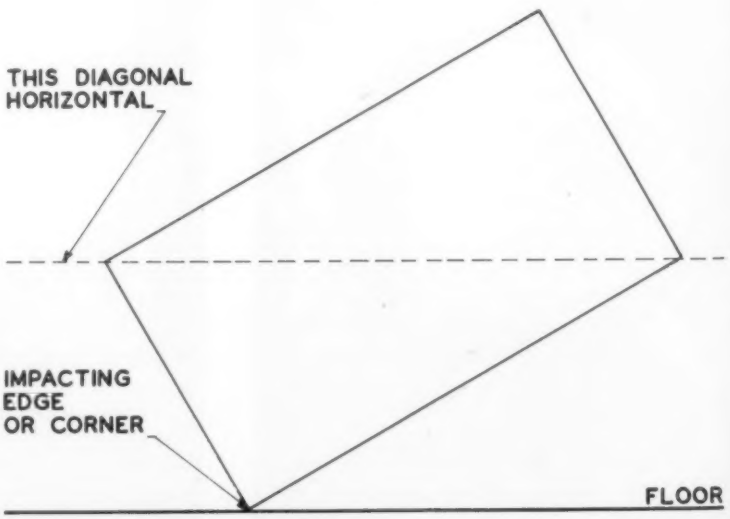
In the foregoing discussion (in the first part of this article) on comparative and investigational testing, we suggest that the best way of making an assessment of package performance is to study the hazards of the distribution system; then reproduce them in simplified form under controlled laboratory conditions. Sequences of this nature have been produced by many testing organizations all over the world during the past 10 or 15 years.

TEST SCHEDULES

Because the originators have had experience with their particular test schedule, they are able to assess the condition of the contents of the package and the container in relation to previous tests made on similar products. Thus, their conclusions from the tests give accurate predictions of performance in the field. Different laboratories, having different test schedules, arrive at the same conclusion about the package, but would rarely agree on details of the test.

During the next decade, it is possible that standard evaluation procedures may be evolved. To focus attention on the need for such procedures, the following schedules are given. They are based on my experience between 1949 and 1958 while working at the Printing, Packaging and Allied Trades Research Association. They were an attempt to produce test schedules capable of deciding for which type of distribution system a package was suitable.

In studying them, remember that they are limited insofar as they represent a single opinion based on an arbitrary judgment of what may be described as "satisfactory condition" for the contents and the package. As an illustration of this, Schedule B, if carried out on a package for canned peas, will give more damage to the cans than would occur on a normal journey, and the term "satisfactory" is related to the experience gained with successful packages during the preceding years.



3 CERTAIN DIAGONAL OF SHIPPING CASE should be horizontal (parallel to floor or dropping platform) when drop-testing shipper onto given impacting edge or corner.

We present the schedules with the hope of stimulating thought and discussion on how tests should be made. We hope that anticipated criticisms will be constructive rather than detrimental.

Schedules A to F are for rectangular packages. Where cylindrical packages such as drums and barrels, or flexible packages such as sacks, are involved, other procedures are required.

4 **COMPRESSION TEST** is most useful in making control tests on containers which are empty, or loaded to proper weight with dummy contents. Test records distortion continuously at any given load; results relate to distortion produced in package at bottom of stack.

TEST SCHEDULE A

Notes:

Suitable for weights up to 20 lb.
No dimension over 15 in.
Principal method of distribution: parcel post (home or overseas).
5 complete packages required for the tests.

Tests:

Package No. 1–
Drum test (7 ft.):
Subject package to 24 falls.
Examine.

Package No. 2–
If package No. 1 is unsatisfactory, repeat drum test as for No. 1, except:
12 falls.
Examine.

Package No. 3–
Drop test:
(a) Drop onto all faces from 30 in., total of 6 drops.
(b) Drop onto all edges from 40 in., total of 12 drops.
Examine briefly after (a) and fully after (b).

Package No. 4–
If package No. 3 is unsatisfactory, repeat drop test as for No. 1, except:
(a) at 24 in.
(b) at 30 in.
Examine briefly after (a) and fully after (b).

Package No. 5–
Vibrating table test:
Under load of 100 lb., vibrate for 15 min., with package standing on its base.

Note: During the testing, continually observe the package for exterior damage, and note its behavior in this respect. Make a full examination of the contents at the points indicated.

Interpretation Of Results:

1. If tests on packages Nos. 1, 3, and 5 are completed satisfactorily, the packaging method should be adequate for all types of distribution including parcel post.

2. If tests on packages Nos. 1 and 3 are not completed satisfactorily, but tests on packages Nos. 2, 4, and 5 are satisfactory, then some judgment must be applied as to the adequacy of the package for parcel post, but for other less hazardous distribution methods, the package should be all right.

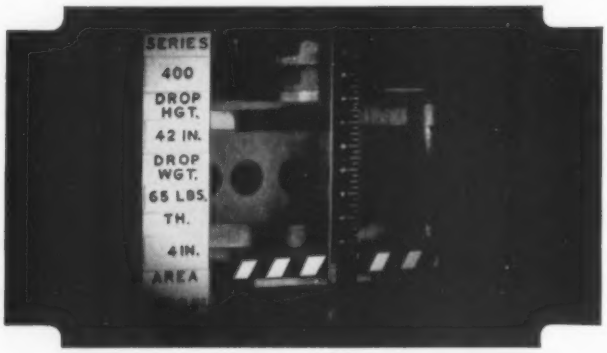
3. If package No. 5 fails, the load-resisting qualities of the package should be reinforced for methods involving a compression hazard.

4. If package No. 2 fails, the package is quite useless except for delivery by the manufacturer's own transport, and there is no point in testing packages Nos. 3, 4, and 5. *(Turn page)*

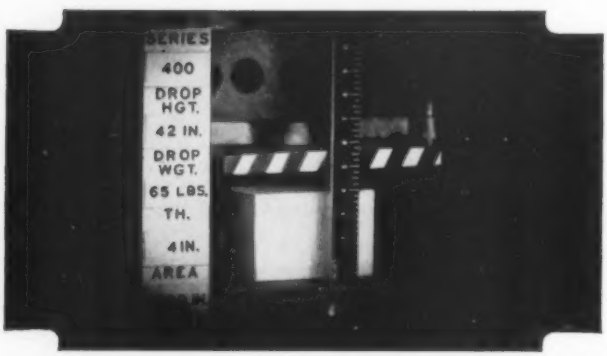
Cushion ta

Fast film catches re revolutionary new pa

In the first photograph, a 65-pound weight is being dropped 42" onto a 4" thick piece of Armstrong Resilo-Pak 400 (1.3 lbs. per cubic foot density). The top surface area of the Resilo-Pak pad is 30 sq. in.



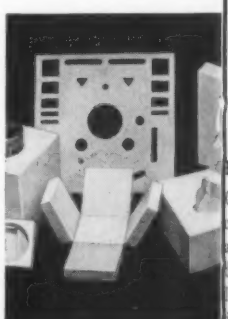
The second photo shows the pad at the point of maximum compression, squeezed to about ½" thickness. Note that under this high compression, the Resilo-Pak pad does not bulge or flow at the sides and has not bottomed out.



The third photo, taken a fraction of a second after the weight has bounced upward, illustrates the remarkable recovery of the pad of cushioning to almost its original thickness. Measurement taken three minutes after a series of five drops, each one minute apart, showed recovery to 96.9% of original thickness, or a dynamic set of only 3.1%.

The three illustrations on the left are from a high-speed motion picture sequence filmed at 3200 frames per second. They dramatically illustrate the remarkable resilience and recovery of Resilo-Pak.

This newly developed material is composed of millions of tiny polystyrene beads that have been expanded into molded form, and tempered to close tolerances for unidirectional resiliency and flexibility. Inch for inch and dollar for dollar, Armstrong Resilo-Pak is one of the most efficient shock-absorbing cushionings on the market today.



Resilo-Pak can be die-cut, bent, cemented, and scored to form almost any shape. Its thermal conductivity is low, allowing it to be used as a thermal insulator as well as a package cushioning. It is odorless, non-corrosive, non-dusting, and non-abrasive. In addition, product identification and instructions can be printed directly on its pure white surface.

Dynamic cushioning properties of Resilo-Pak

Since it is under dynamic conditions that products are shipped and handled, it is logical to evaluate cushioning materials the same way, re-creating in the laboratory conditions they endure in use.

The graph above right shows the protection offered by three different thicknesses of Resilo-Pak 300 at a 30-inch drop height. Note the amazingly uniform G level over a wide unit load (static stress) range.

Continuing evaluation of the dynamic cushioning properties of Resilo-Pak is going on at Armstrong's Research and Development Center. Results show good agreement with *static* test data on Resilo-Pak, which is not the case with many other kinds of cushioning materials.

120-G's
100-G's
80-G's
60-G's
40-G's
20-G's

Energy
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Resilo-Pak
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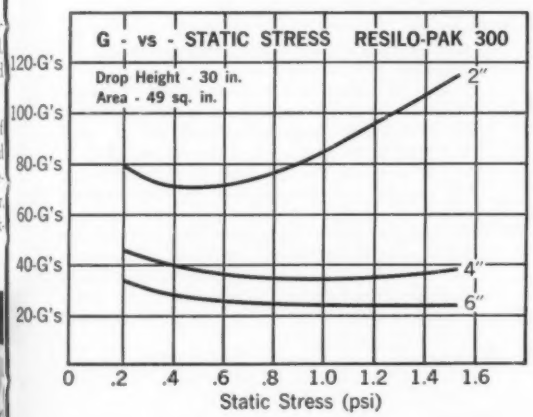
ntakes shock, makes rapid recovery

remarkable resilience of Resilo-Pak, the TRADE-MARK package cushioning from Armstrong



Energy absorption per dollar

Chart at right shows results of static laboratory tests on many commonly used cushioning materials. Resilo-Pak's energy absorption per dollar ranges from three to forty times greater than that of any other cushioning product that was tested. It also has a striking ability to retain its high energy absorption, from – 80°F. to + 165°F.

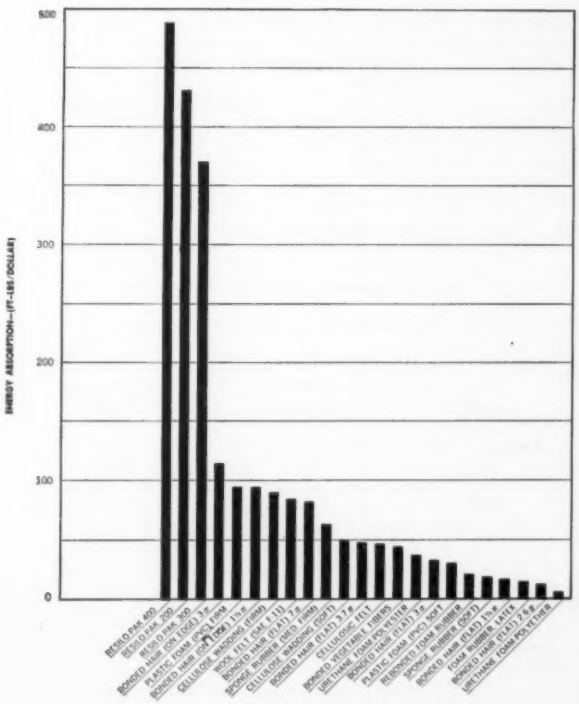
Summarizing Resilo-Pak

Armstrong Resilo-Pak is a new cushioning material that absorbs more energy per dollar than any similar material and maintains its energy-absorbing ability over wide loading and temperature ranges. Its high energy absorption and low density create an opportunity to reduce packaging costs: (1) by reducing the amount and cost of cushioning material, (2) by reducing the size and cost of the package, (3) by reducing cubage and the expense of shipping and warehousing.

Resilo-Pak meets requirements of interim Federal Spec. PPP-C-00850

Armstrong

RESILO-PAK



Armstrong Cork Company
3112 Pearl St.
Lancaster, Pa.

Please send me more information about Resilo-Pak.

Name .....

Position .....

Company .....

Address .....

TEST SCHEDULE B

Notes:

For home transport including Northern Ireland.
Suitable for weights of 20 to 100 lb.
Maximum dimensions: 36x24x24 in.
Principal methods of distribution:
Passenger train (Railway Express),
Mixed goods—road/rail (LTL and LCL),
Full container loads—road/rail (truck load and CL),
Manufacturer's own transport.
5 complete packages required for the tests.

Tests:

Package No. 1—

Drop test:

Drop from 12-in. height onto:
(1) Base,
(2) Longer base edge,
(3) Shorter base edge,
(4) Opposite base corner,
(5) Top.

(2), (3), (4): Dropped so that diagonal through case is horizontal (see Fig. 3).

Vibrating table test:

Under load equivalent to a stack 8 ft. high, vibrate for 15 min., with package standing on its base.

Stacking test:

Stack under load equivalent to stack 12 ft. high (not less than 250 lb.) for 24 hr.
Examine.

Package No. 2—

Drop test:

Drop from 18-in. height onto:
(1) Base,
(2 to 5) Each base edge in turn (diagonal horizontal, see Fig. 3),
(6) Top.

Inclined plane test:

Use 6-ft. run, make 3 blows onto each side face and each vertical edge, total of 24 blows.
Examine.
Note: It would be possible to replace the inclined plane test with either some form of pendulum tester or (but not preferably) a drop test.

Package No. 3—

Test as for package No. 1, but use top as base.
Examine.

Package No. 4—

Test as for package No. 2, but use larger side face as base.
Examine.

Package No. 5—

Drop test:

Use same test as for package No. 1.

Inclined plane test:

Use 10-ft. run, make 1 blow onto each side face and each vertical edge, total of 8 blows.
Note: It would be possible to replace the inclined plane test with either some form of pendulum tester or (but not preferably) a drop test.

Drop test:

Drop from 24-in. height onto:
(1) Base,
(2 to 5) Each base edge in turn (diagonal horizontal, see Fig. 3),
(6) Top.
Examine.

Note: During the testing, continually observe the package for exterior damage, and note its behavior in this respect. Make a full examination of the contents at the points indicated.

Interpretation Of Results:

1. If all five packages pass satisfactorily, they should be considered suitable for all distribution methods, including passenger trains (Railway Express).

2. If package No. 5 fails, it is not suitable for general distribution by passenger train (Railway Express).

3. If only packages Nos. 3 and 4 fail, they may be considered suitable for all methods of distribution, provided that the package is fairly certain to travel on its base.

4. If only package No. 1 is satisfactory, then it may be considered as suitable only for good handling systems of distribution.

TEST SCHEDULE C

Notes:

For home trade including Northern Ireland.
Suitable for weights of 100 to 1,000 lb.
No dimension over 5 ft.
Test only 1 package.

Tests:

Package No. 1—

Vibrating table test:

Vibrate 15 min. in both directions, with package standing on its base (and 5 min. on each of the other 5 faces where necessary).
Examine.

Impact test:

Test all 6 faces from 10-in. swing on the LAB pendulum tester.
Examine.

Shower test: (omit where not necessary)

Hold under shower for 5 min., followed by 24 hr. at room temperature, followed by humidity test.

Humidity test: (omit where not necessary)

Store 7 days at 100°F., 90% R.H.

Rolling test:

Run test base to base, both directions.
Examine.
Note: The rolling test is performed as follows: With the package standing on its base, push it slowly to rotate about one edge of the base until it is just balanced on this edge. Then, allow it to fall over onto the side face. After this impact, lift the base of the package so that rotation occurs about the top edge, and, after reaching the balance point, allow it to fall over on the top. Repeat this procedure until the package once again stands on its base. Then repeat the whole sequence from base to base traveling in the direction at a right angle to that taken in the first half of the operation.

Stacking test:

Stack under load equivalent to stack 18 ft. high (not less than 500 lb.) for 48 hr.

Drop test:

Drop from 12-in. height onto each face.
Examine.
Drop from 12-in. height onto each corner.
Examine.

Note: During the testing, continually observe the package for exterior damage, and note its behavior in this respect. Make a full examination of the contents at the points indicated.

Interpretation Of Results:

1. If more than one package is available, test package No. 1 up to the completion of the rolling test. If this proves to be satisfactory, a package of greater than 200-lb. weight will generally be satisfactory for most distribution systems where handling is known to be reasonable.

2. If handling is likely to be rough, or the weight is below 200 lb., then all tests should be completed with satisfactory results. The second package can be used for check testing. The shower and humidity tests can be omitted where there is no shower hazard, or no damp storage risk.

TEST SCHEDULE D

Notes:

For export.
Suitable for weights of 20 to 100 lb.
Maximum dimensions 36x24x24 in.
Principal methods of distribution: Truck and/or rail and ocean shipment.

5 complete packages required for the tests.

Tests:

Package No. 1—

Drop test:

Drop from 18-in. height onto:

(1) Base,
(2 to 5) All base edges in turn,
(6) Base corner,
(7) Opposite base corner,
(8) Top

Dropped so that diagonal through case is horizontal (see Fig. 3).

Inclined plane test:

Use 10-ft. run, make 1 blow onto each side face and each vertical edge, total of 8 blows.

Vibrating table test:

Under load equivalent to stack 8 ft. high, vibrate for 30 min., with package standing on its base.

Stacking test:

Stack under load equivalent to stack 18 ft. high (not less than 500 lb.) for 48 hr.

Examine.

Package No. 2—

Drop test:

Drop from 30-in. height onto:

(1) Base,
(2 to 5) All base edges in turn,
(6 to 9) All top edges in turn,
(10) Top.

Drop from 12-in. height onto:

(1 to 4) Each side face in turn.

Examine.

Package No. 3—

Test as for package No. 1, but use top as base.

Examine.

Package No. 4—

Test as for package No. 1, but use larger side face as base.

Examine.

Package No. 5—

Shower test:

Hold under shower for 10 min., followed by 24 hr. at room temperature.

Humidity test:

Store 7 days at 100°F., 90% R.H.

Drop test:

Test as for package No. 1.

Stacking test:

Test as for package No. 1.

Examine.

Note: During the testing, continually observe the package for exterior damage, and note its behavior in this respect. Make a full examination of the contents at the points indicated.

Interpretation Of Results:

1. Complete satisfaction in all tests indicates packages should be suitable for all systems of distribution.
2. If all packages are satisfactory except No. 2, it indicates the package will be suitable where handling is good.
3. Failure in tests on packages Nos. 3 or 4 indicates package is suitable only where package is likely to travel right side up.
4. Failure in tests on package No. 5 indicates package is suitable only where there is no shower or humidity hazard.
5. If all packages fail except No. 1, it indicates that package is suitable only where good handling can be guaranteed.

TEST SCHEDULE E

Notes:

For export.
Suitable for weights of 100 to 500 lb.
No dimension over 5 ft.
Test only 1 package.

Tests:

Package No. 1—

Vibrating table test:

Vibrate 10 min. on each face in turn.

Examine.

Impact test:

Test all 6 faces from 10-in. swing on the LAB pendulum tester.

Examine.

Shower test:

Hold under shower for 10 min., followed by 24 hr. at room temperature.

Examine.

Humidity test:

Store 5 days at 100°F., 90% R.H.
Store 2 days at room conditions.
Repeat cycle once (twice in all).

Examine.

Rolling test:

Run test base to base, each direction.

Examine.

Note: See procedure under rolling test for package No. 1 in Test Schedule C.

Stacking test:

Stack under load equivalent to stack 18 ft. high (not less than 500 lb.) for 48 hr.

Examine.

Drop test:

To determine height of drop, use formula: Weight (lb.) × Drop height (ft.) = 400, but do not use height greater than 18 in.

Drop from height determined onto:

(1) Each face in turn,
(2) Diagonally opposite base and top corners.

Examine.

Note: During the testing, continually observe the package for exterior damage, and note its behavior in this respect. Make a full examination of the contents at the points indicated.

Interpretation Of Results:

1. If package completes test schedule satisfactorily, then it should be adequate for all normal methods of transport. If any damage occurs, then the degree of damage must be taken into account in the decision.

TEST SCHEDULE F

Drop Sequence For Investigation Of Package Strength

In the introductory discussion of investigational or research testing (see "Research Testing" section, Part I), we discuss a method of investigating package strength without relation to the anticipated journey hazards. The following two testing sequences are particularly useful for this type of work:

(A) Package and contents entirely symmetrical (manufacturer's joint in fibreboard cases is normally ignored as a point of asymmetry)—

Drop package onto:

(1) Corner,

(2 to 4) The three edges radiating from the corner involved in the first drop, the longest being tested first, and the shortest last,

Note: Make all drops with the center of gravity of the package vertically above the point of impact.

(5 to 7) The three faces adjacent to the corner, the largest face being tested first, and the smallest last.

(B) Package unsymmetrical in regard to top and bottom—

Use the sequence of tests given under (A) above, except that two corners are involved in one complete sequence. The "corners" are a bottom corner and the diagonally opposite top corner of the package, that is, the corner that is farthest away from the first. This gives a sequence of 14 drops.

Both sequences are used in a similar manner. Normally, the initial height for the first sequence is 12 in., and the increases for each succeeding sequence are 3 in. or 6 in. Damage is recorded as the test progresses, but the breakage positions are omitted in all sequences subsequent to the one in which they occurred.

(Turn page)

How Lord Baltimore helps package 62,000 fish sticks every hour

LORD BALTIMORE'S packaging service extends beyond the creation of high-quality, printed cartons for Gorton's of Gloucester. Here is how our experts increased production efficiency for this volume processor of sea foods.

To meet rising demand, Gorton's looked for a more efficient way to sort and package fish sticks. The installation of our Dex-O-Pak* system was the answer. It unscrambles the product and completes the entire packaging cycle in less than *3 minutes.*

We offer high-speed packaging systems and cartons for any volume product. Our nationwide engineering program includes installation, regular servicing, operational training and maintenance.

Lord Baltimore's packaging service can increase your production efficiency. For information, write: 425 Park Ave., N. Y. 22, N. Y.; San Mateo, Calif. or 333 N. Michigan Avenue, Chicago, Ill. *T.M.

Lord Baltimore Press

Our Cumulative Editorial Index for 1960 starts on Page 98 of this issue. Some of the articles listed (and some that were published prior to this year) are still available. You may have a single extra copy of those available as long as our supply lasts. Just write your request (on your company letterhead) to:

Reader Service Department
Package Engineering
185 N. Wabash Avenue
Chicago 1, Illinois

II. Container Testing

After evaluating the potential performance of a package by means of the laboratory transport test, it is desirable to realize that such testing methods are to be avoided for control purposes in the production of containers since the tests are lengthy; also, in many instances, the manufacturer of the container is not completely aware either of the contents of the container nor the destination of the product that its container will carry. It is, therefore, standard practice to make control tests on containers that are preferably empty, but which may be loaded to the appropriate weight with dummy contents.

The Compression Test

The most useful test in this connection is the compression test. It consists of two platens that can be driven toward each other at a controlled rate so as to compress a container placed between them. It records the distortion of the container continuously at any given load (see Fig. 4).

It is fairly obvious that the result of a top-to-bottom compression test will be related to the distortion produced in packages which are at the bottom of stacks. However, the relation is not so clear between the relation of a corner-to-corner compression test and a drop on the corner of a package in transit. The rate of loading in the latter instance will be much greater than that provided by a compression test, and little work has been done to correlate such tests with performance drops.

Use Dummy Contents

General purpose containers are frequently tested by filling them with dummy contents and using the drop test as a means of evaluating their performance. For example, drums of steel, plywood, or fibreboard are tested by filling them to the appropriate weight with a mixture of sand and sawdust for dry products, or water for liquid products. They are then subjected to drop tests in the major positions of fall, viz., onto the base, the side, and the top and bottom chimbs (chime in U.S.A.).

Sacks may also be tested by means of the drop test, using various types of granular filling. However, the results must always be related to the hazards of the journey and the contents concerned.

In testing both drums and sacks, it is preferable to fill them with the actual contents to be shipped if their identities are known.

III. Material Testing

The previous two sections show how it is possible to estimate the performance of a package in service by means of laboratory trans-

(Advertisement)

How LORD BALTIMORE's packaging service saves time and money for Gorton's

BEFORE recommending a specific mechanized system, Lord Baltimore's engineering staff surveyed and analyzed Gorton's complete packaging operation. Production called for the immediate packaging of fish sticks as they tumbled from the freezer onto a continuously moving belt. Lord Baltimore's Dex-O-Pak* system was chosen to unscramble and package this jumble of frozen fish sticks.

From chaos to carton

Dex-O-Pak's automatic integrating system quickly aligns the fish sticks into two even rows of 8 sticks each. The rows are then automatically layered and the 16 fish sticks are inserted into a one-piece printed carton. Finally, each carton is closed and sealed by Lord Baltimore's high-speed Thermo-Stik® process. The entire Dex-O-Pak operation takes less than 3 minutes from chaos to sealed carton. A 4-color Fidel-I-Tone® carton that *sells on sight.*

Matched nationwide facilities

Lord Baltimore's folding box plants are located in Baltimore, Md.; Clinton, Iowa and San Leandro, Calif. They are backed by the complete resources of International Paper's mills and research centers. Our matched nationwide facilities and 11 sales offices serve these packaging fields:

Frozen Foods	Beverages
Dry Foods	Pharmaceuticals
Cosmetics	Tobacco
Dairy Products	and many others

*T.M.

Labeling Lines

by George L. N. Meyer, Jr.

DESIGN AND THE LABEL

Surely, in this self-service era, everyone is aware of the vital role played by package design. With the average "exposure time per shopper" being a mere eight seconds, the package bears a major part of the selling burden. As a consequence, poor packaging is frequently responsible for poor sales.

In the case of labeling glass and plastic containers (particularly in the bottle field), there are stringent limitations which must be adhered to by the designer. All too often merchandising people get enthused about a certain combination of labels only to discover that they are impractical for machine application at desired line speeds.

Perhaps, the most logical source for avoiding such trouble is one that most people neglect . . . *the machinery builders.* As the world's foremost manufacturer of high speed labeling equipment, Economic Machinery Company has established a complete design service. Regardless of your packaging problem . . . if it involves labeling . . . we hope you will take advantage of this important new aid to better packaging.

THE CONTAINER

First a product . . . then the container! Should your choice be glass, what shape is most convenient or practical for the user? Should it be tapered? . . . bell or wasp-waisted? . . . oval, flat, round or square? Should it have an elongated neck or no neck at all? Will you be able to use a "stock" bottle or must it be customized? In any event, it is imperative that you establish a glass "standard" to which your supplier must adhere. This insures consistent fill level . . . proper labeling position . . . better conveyor feeding and many other essential requisites. Again, EMCO can assist you in establishing these standards.

NEXT . . . THE LABELS

More problems . . . for instance, shape? Number of labels? Position? Type of paper? Tolerance? Grain? Die-cut or guillotine-cut? Perhaps, you will require a spotting lug on the container itself to be sure that the body or shoulder label is always correctly positioned.

Variations in glass or labels can play havoc with a high speed labeling operation no matter how carefully your machine is engineered. With our assistance, labeling standards can be determined which can be used to excellent advantage.

THE GLUE

The glue . . . often regarded as necessary but not important. *A dangerous assumption!* The adhesive must be formulated to operate cleanly and efficiently in the machine. There are four main classes; Dextrins, Jelly Gums, Animal Glues and Caseins. The basic characteristics of each type, the effect of moisture and humidity on the dried film and the final adhesion properties must be considered. Coverage is another important factor. It may be expressed in a number of ways, but dilution, film thickness, machine adjustment and other factors create variations.

These thoughts may seem extremely technical to merchandising people and we agree, they are! However, they are highly pertinent to your cost picture and every product manager or packer must be concerned with packaging cost as much as with package design.

THE MACHINE

EMCO service includes a complete and fair appraisal of your labeling machines. We can often recommend minor improvements to your existing equipment . . . new ways to broaden your capability.

PLASTIC

As with glass, blow mold or other plastic containers present many technical problems on the packaging line. Broad experience in this area enables us to help you from the beginning!

All in all . . . we can be of real assistance. Most important, perhaps, is our ability to set up effective packaging that can be cost controlled! Surely, the cost-per-unit is a vital consideration to every product or merchandising manager.

We'd like to have *your* problem! Specific recommendations can be made in a relatively short time. Won't you let us hear from you?

World's Largest Manufacturer of high-speed Labeling Machinery

WORLD LABELERS

ECONOMIC MACHINERY COMPANY • Worcester 3, Mass. / Div. of Geo. J. Meyer Manufacturing Co.

port tests on packages, and to control the performance by means of container tests. Generally speaking, these provide adequate control for the majority of package users.

The manufacturer of the package, however, is faced with the problem of selecting its material so that the package produced from it will measure up to the requirements of the service tests. Therefore, the manufacturer needs to select materials by means of tests that will eliminate unsatisfactory batches and at the same time enable it to predict the strength characteristics of the completed package.

This is particularly important when the container is made of paper or paperboard. For example, a fibreboard case manufacturer may be asked to produce a case that will be capable of stacking 24 cases high in a warehouse, when the bottom case will have to sustain a load of 450 lb. Such stacks may be in existence for periods up to six weeks in duration and the relative humidity of the surrounding atmosphere may rise to 85 to 90 per cent. The manufacturer, therefore, needs a test on the paper from which this box will be made, which will insure that this performance level will be reached.

The Ring-Crush Test

Such a test has been the subject of considerable work during the last decade and several partial solutions have been produced. One of the most common tests used for this purpose is the ring-crush test. Similar problems exist in the selection of paper for bags and sacks, plastic films, overwraps, and so on.

While it is true to say that the laboratory tests on complete packages give reasonably accurate estimates of the service performance of a package, the same is not true with tests on packaging materials. There are a large number of tests currently in use on the latter, that do not correlate at all well with performance of the package, i.e., the filled container. A considerable amount of research is still necessary in this field. *(End)*

ANNOUNCEMENTS OF MACHINERY AND PRODUCTS

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3. Next, *fill* in your name and address.
4. Then, *mail* the card—we pay the postage. For your convenience, we have also included addresses of suppliers so that you may write directly for more information.

1—Metered Spray

A new metered attachment for accurate spray control of oral dosages has been announced.

The Emson oral attachment is made of Dylan polyethylene and its two components are designed for simple, instantaneous operation. Slight pressure on the combination cover-mouthpiece releases a metered amount of medication. The unit fits on standard 20-mm valves, which are generally used with glass bottles, and may also be used with Emson's special stainless steel containers. The metered valves range in dosage from as low as 35 mg. to any larger size required. For more information write: Emson Research, Inc., Dept. PE, 118 Burr Ct., Bridgeport, Conn., or *circle number on card.*

2—Heat Sealer

A new large-size heat-sealing unit is designed for permanent mounting or for service as a portable unit. Model TT-23 has a convex sealing plate which measures 6x7 in. The temperature range of the heat sealer is between 150 and 550°F. The Electro-Sealer may be used with all types of packaging films, the maker states. For more information write: J. B. Dove and Sons, Inc., Dept. PE, P.O. Box 5, Bristol, Pa., or *circle number on card.*

3—Produce Tray

Recently developed is a 2-qt. molded paper produce tray in green for the retail packaging

of fruits and vegetables. Measuring 11x6¼x2¾ in., the paper material is 0.090 in. thick. The molded pulp is treated for resistance to moisture absorption and, to permit proper ventilation, slots are constructed in the bottom of the tray. Various types of over-wrapping materials may be applied to the produce trays. For more information write: Keyes Fibre Co., Dept. PE, Waterville, Me., or *circle number on card.*

4—Heat-Shrinkable Bags

Development of contour bags of heat-shrinkable Mylar polyester film has been announced. The bags provide clear and strong skin-tight wraps for processed meat and poultry products, the maker says, and are highly impermeable to moisture and vapor. The new bags may be used with slight adjustments on standard closure and shrink processing equipment. At a water temperature of 205 to 212°F., the film shrinks without distorting the bag printing. For more information write: E. I. du Pont de Nemours & Co. (Inc.), Dept. PE, Film Dept., Wilmington 98, Del., or *circle number on card.*

5—Parts Handling System

An automatic, integrated parts handling system is now available for high-speed assembling,

counting, inspecting, packaging, etc. A vibratory parts feeder hopper, the Automator, orients the parts into the required position and feeds them into a chute for delivery to the use-point. The unit also has an escapement mechanism which releases parts singly or in lots. The system has a feed rate of up to 90 ft./min., and standard feeder sizes range from 5- to 36-

Data Processing Equipment
ready for shipment, packaged
in tough film made from
Monsanto Polyethylene 706 resin.

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Polyethylene
TOUGHNESS
saves your packing dollars here

A tear in packaging can be both irritating and expensive. Get maximum protection against dust, moisture, and scratching by using polyethylene film made from tough Monsanto Polyethylene 706 resin.

706 was formulated for the heavy duty requirements of industrial packaging. It has the tensile strength and impact resistance to give superior service even under the roughest treatment.

For names of converters and suppliers of tough polyethylene bags and liners, write Monsanto Chemical Company, Plastics Division, Room 702, Springfield 2, Massachusetts.

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***Styl-O-Matic* ROTARY UNSCRAMBLING TABLE**

- Cartons of bottles, jars, cans or containers are inverted on to the tilt top table and their contents pushed onto the revolving disc. Units are *automatically regimented and despatched in single file* to the conveyor.

LOWERS HANDLING COSTS ACCELERATES PRODUCTION

- Conveyor carries units to other operations such as filling, capping, labelling, etc. Handles up to 100 units per minute depending upon diameter.

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Miami 38, Florida
Please send particulars on the Styl-O-Matic Rotary Unscrambling Table.

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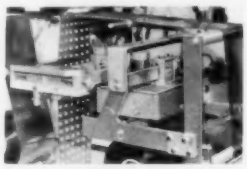
in. diameters with clockwise or counter-clockwise feed direction. For more information write: General Automation, Div. of Automator Corp., Dept. PE, 2315 Magnolia Blvd., Burbank, Calif., or *circle number on card.*

6—Imprinting Attachment

A new variable-size imprinting attachment for strip packaging machines that is designed to apply trademarks, code dates, and other legends to heat-sealed unit packs has been developed. It uses a new type of heat-



resistant fluid ink that withstands heat-sealing and won't come off on sealing rolls, according to the manufacturer. The 780 Rolaprinter machine accommodates a variety of type-wheels between 6- and 12-in. circumference. The unit is available to print areas up to 10 in. across webs of film, foil, and paper. For more information write: Adolph Gottscho, Inc., Dept. PE, 6 Evans Terminal, Hillside 5, N.J., or *circle number on card.*

7—Film Resins

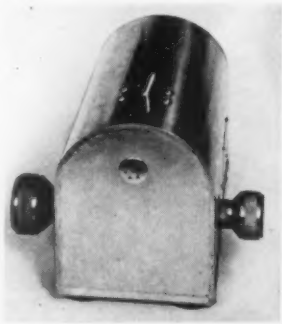
Development of two new series of polyethylene film grade resins has been told. The 660E series is an intermediate (0.930) density resin engineered specifically for overwrap and thin-gauge applications. Series 561E through 564E are low (0.921) density materials designed to fulfill demands for a high impact film resin with high gloss and clarity. The producer says that both series of resins exhibit excellent drawdown and processing characteristics that make them suited for flat film extrusion by either water bath or chill roll techniques, as well as for blown tubing. For more information write: The Dow Chemical Co., Dept. PE, Plastics Sales Dept., Midland, Mich., or *circle number on card.*

8—Heavy-Duty Scales

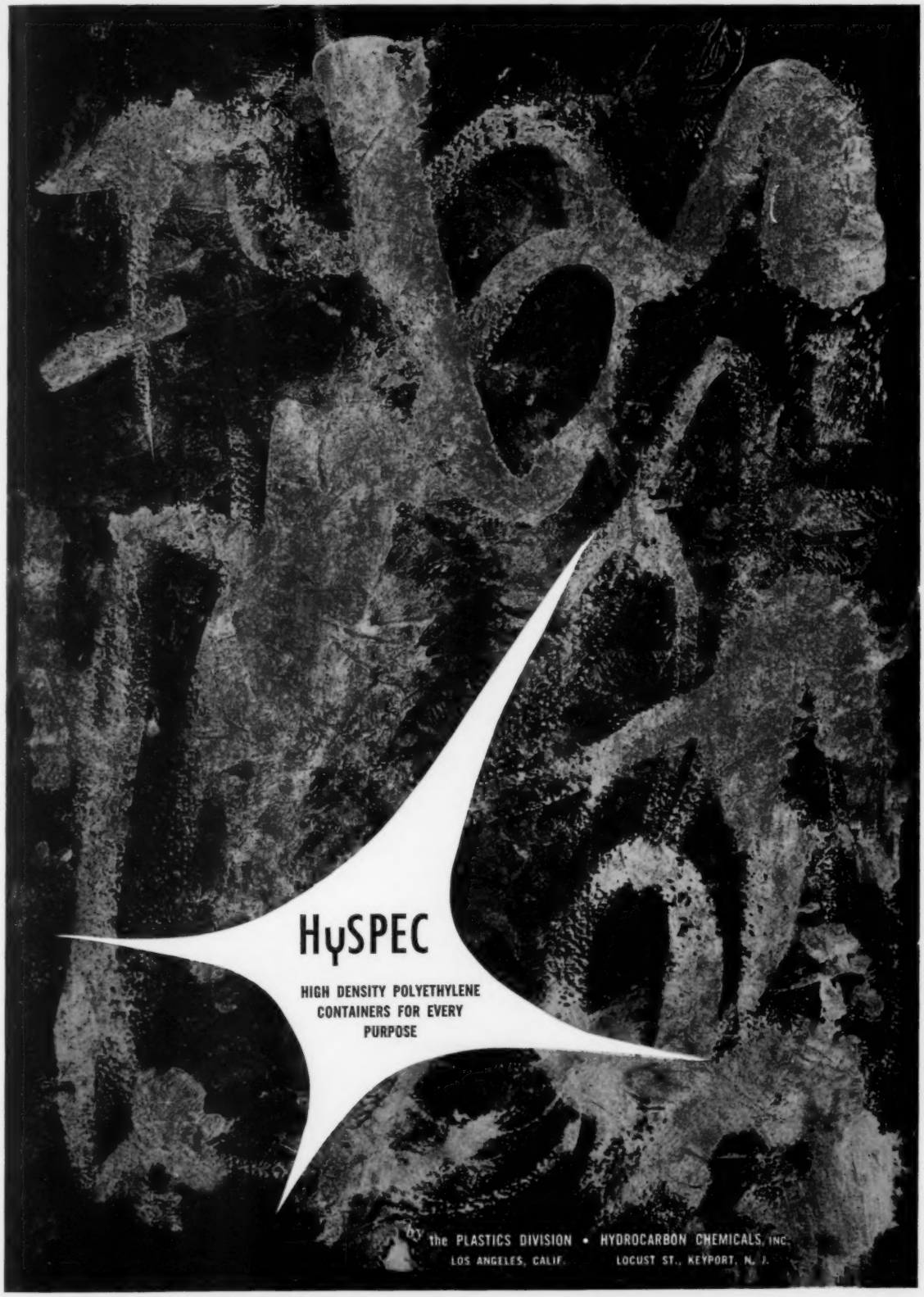
A new line of heavy-duty dial scales with capacities ranging from 35 to 10,000 lb. is being introduced. The line includes bench, portable, and dormant models with a complete selection of chart, beam, and drop weight combinations. The scales feature a double pendulum system with machined cams for accuracy. Full-floating platforms give protection from shock loading and rough usage. Another feature is the 25-in. dials with dial indicators controlled by adjustable hydraulic dashpots. For more information write: Pennsylvania Scale Co., Dept. PE, 21 Graybill Rd., Bareville, Pa., or *circle number on card.*

9—Cap Tightener

The Torkett capper is designed for tightening caps of variable size or quantity on short runs.



It may also be used at the end of automatic lines as a final inspection for cap tightness. The portable unit weighs 35 lb. and has two different chucks to handle almost any size of cap of both regular and odd shapes. For tightening caps, the operator places a cap loosely on each bottle and then touches the cap against the chuck. For more information write: Testing Machines, Inc., Dept. PE, 72 Jeri-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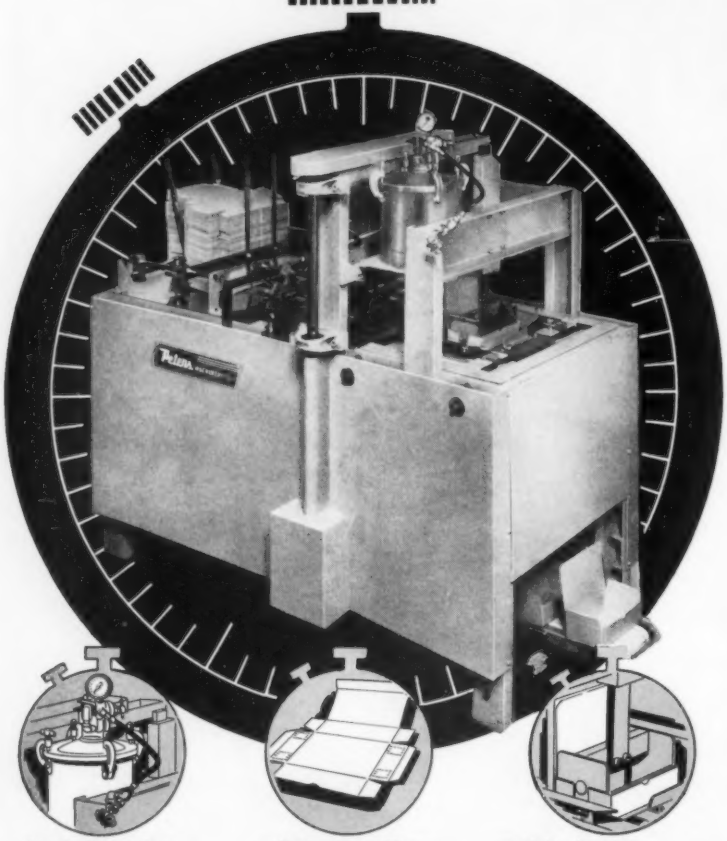
Cartons and Trays 70 PER MINUTE!



closed glue system provides clean gluing . . . eliminates costly make-ready and clean-up.

uniform glue pattern— glue is released only when applicators make contact with carton or tray blank.

precision forming— mandrel presses blank into forming run, bringing flaps into bonding contact.

Specially designed for low initial cost . . . heavy duty operation . . . moderate speeds . . . and economy of operation! New closed glue system permits immediate operation without make-ready waste . . . eliminates costly clean-up. Forms and glues a wide range of carton and tray sizes for packaging all types of products. Remember, **glued** cartons cost less for material, shipping and storage . . . and eliminate costly set-up labor. **Peters Model PG.**

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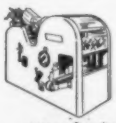
carton folding and closing machines

high-speed carton and tray forming machines



carton forming and lining machines

cellophane sheeting and stacking machines

cho Turnpike, Mineola, N.Y., or *circle number on card.*

10—Asphalt Drums

The new Sta-Tite asphalt drums recently introduced incorporate a zipped bottom closure which

opens easier and faster and prevents leakage, the manufacturer says. The zipped closure is accomplished by use of Sta-Metal bands which eliminate the use of stitching wire. Consolidated will convert and service any Bostitch-Bliss stitcher to use the new metal. By merely prying loose the end of the metal band, a pull with a pliers zips the bottom of the drum off. For more information write: Consolidated Paper Co., Dept. PE, Monroe, Mich., or *circle number on card.*

11—Adhesive

Proxseal adhesive No. 37-164-8 has recently been added to this company's line of special cements. A feature of this product is its effectiveness as either a wet-bonding cement or when applied to the individual surface, dried, and subsequently solvent activated to make the seal. The adhesive may be used on similar or on mixed surfaces including vinyl, saran, Pliofilm, rubber, polymer-coated cellophane, glass, and a variety of metals. For more information write: Pyroxylin Products, Inc., Dept. PE, 4851 S. St. Louis Ave., Chicago 32, Ill., or *circle number on card.*

12—Inspection Light

A new inspection light for visual inspection of empty and

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You can eliminate fillers and dividers while providing better protection against shock by using molded pulp packaging. Keyes can produce contour packaging to your specifications.

For free consultation on your packaging problems, write Product Development Division, Keyes Fibre Company, Dept. PE-12, Waterville, Maine.

KEYES MOLDED PRODUCTS

filled glass bottles and containers in processing plants is now being offered. The light permits inspection of general appearance, color, filling line level, quality, etc. Terriss lights may be mounted on production line conveyor assemblies or divider-combiner conveyors. The glass packer's inspection light may also be used for detecting broken, cracked, chipped, or dirty bottles and containers. Sodium vapor lights are provided for inspection of semi-opaque, brown, green, or amber colored glass containers. For more information write: Terriss-Consolidated Industries, Dept. PE, 22 Wooster St., New York 13, N.Y., or *circle number on card.*

13—Heat-Seal Label

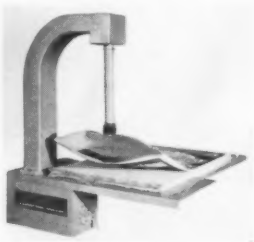
Development of a new end label with a heat-sealing coating called Marabond has been told. The label was designed for use on waxed breadwrappers, M- and K-type cellophane, Pliofilm, and polyethylene. The low-heat activated label eliminates mixed inventory label problems for bakers now using several different types of breadwrapping materials, according to the manufacturer. The label may be used on several different types of machines without special attachments or preactivators. For more information write: Marathon, A Div. of American Can Co., Dept. PE, Menasha, Wis., or *circle number on card.*

14—Glass Jar

A new lightweight glass jar has been introduced for use by food packers. The new glass package, called the Centennial pickle jar, has been reduced in weight over standard jars of comparable size to lower freight costs and was made shorter to take up less shelf space and provide more label facings. The new jar is available in five sizes from 8¾ to 32¾ oz. In the quart size, weight has been reduced by 1½ lb./case. The containers have straight sides and take both the twist-off and screw cap on some sizes. For more information write: Armstrong Cork Co., Packaging Materials Div., Dept. PE, Lancaster, Pa., or *circle number on card.*

15—Bag Opener

The Vacuum Lift is a new machine for handling plastic, multiwall paper bags, paperboard

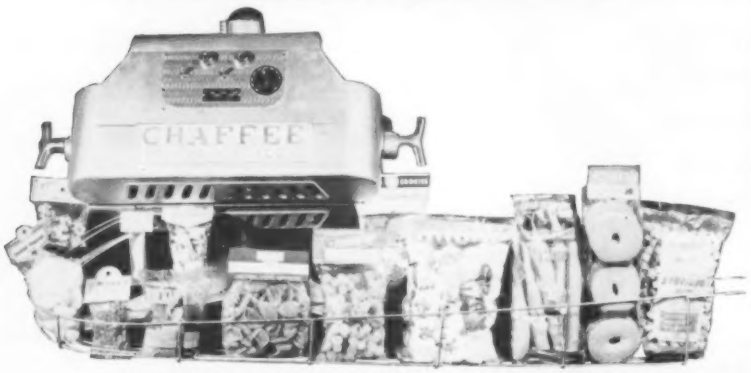


separators, and other smooth or rough-surfaced products. Designed to open from 30 to 60 bags/min. in 6-in. stacks, the machine also speeds up handling time in separating stacked products. A feature of the device is a special wire aid for opening bags, and a mechanical blast device is also available to facilitate handling of bags which are difficult to separate. The machine measures 28x14x24 in. and may be mounted on a workbench or table. For more information write: Maran Mfg. Co., Dept. PE, Batavia 7, Ill., or *circle number on card.*

16—Molding Resin

Development of a polyethylene molding resin, which is said by the maker to set new standards for resistance to environmental stress cracking, has been reported. The company says that the new material, which is designated Poly-Eth 4204, withstood more than 3,000 hr. of the severest standard stress crack testing. Among the applications for the new injection molding resin are containers, closures, pouring spouts, and other parts. A 0.919-density material with a melt in-

CHAFFEE ROTOR-SEALER



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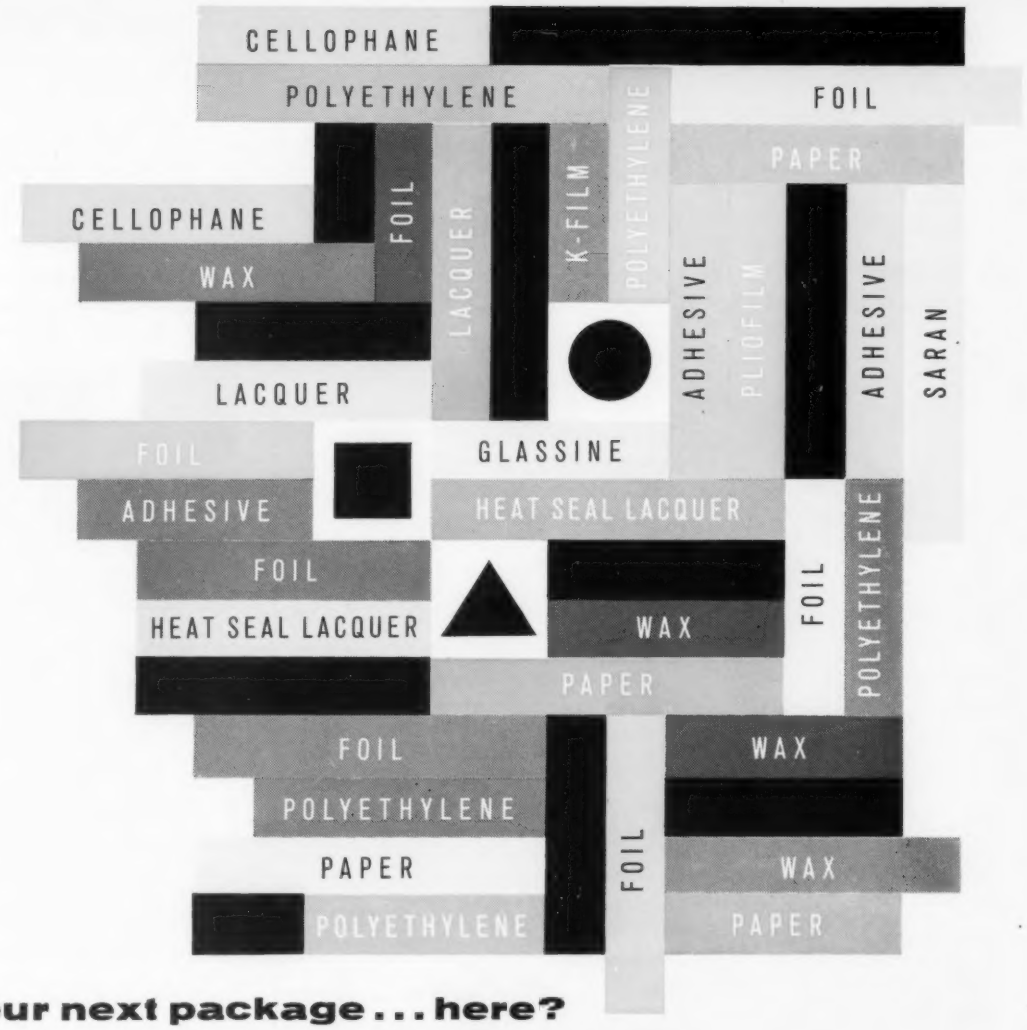

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Yes, here! A Milprint custom combination of two or more of these materials can give your product better protection and more sales appeal with economy of cost. Pioneer in flexible packaging, Milprint approaches your package problem with an open mind. There's no attempt to steer you toward any particular material or process because *Milprint offers you the widest variety available anywhere.*

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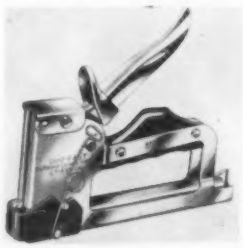
dex of 1.4, it is said to resemble materials of higher melt indices in processing thereby allowing faster mold filling and cooling. A higher melt index version of the resin is also available. For more information write: Spencer Chemical Co., Dept. PE, Dwight Bldg., Kansas City, Mo., or *circle number on card.*

17—Clinch Stapler

A new version of the Duo-Fast outward clinch stapler is being manufactured. This stapler di-



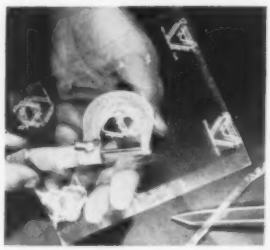
verts the staple legs outward and upward as it is driven, but without the use of any metal plate or anvil beneath the tool. The stapler features an adjustment device which enables the user to control the amount of curl of the staple and to compensate for wear. The tool is used for attaching inventory tickets and various shipping tags to filled corrugated cartons. For more information write: Fastener Corp., Dept. PE, 3756-64 River Rd., Franklin Park, Ill., or *circle number on card.*

18—Inserting Machine

An attachment to a conveyor that will automatically insert protective corrugated dividers between rows of cookies in cartons is being manufactured. Prescored dividers are placed into the feeder mechanism of the unit in a flat position. Moving cartons activate the inserting unit which automatically folds the dividers and pushes them down between the rows of cookies in the filled cartons. The inserter may be attached to all types of conveyor systems and may be used to insert protective dividers between other fragile or specially-surfaced products. For more information write: Peters Machinery Co., Dept. PE, 4700 Ravenswood Ave., Chicago 40, Ill., or *circle number on card.*

19—Corrosion Inhibitor

A new heat-sealable Mylar polyester film that is treated with a volatile corrosion inhibitor is

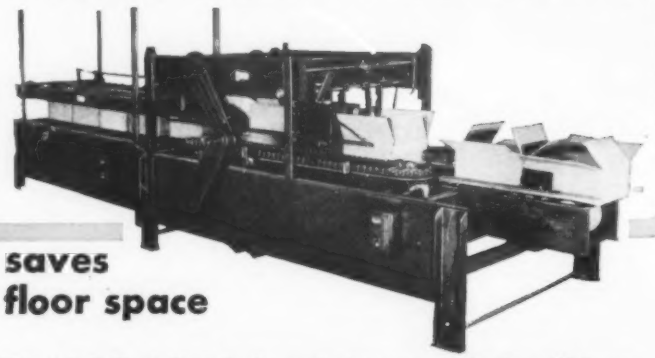


being produced. Marketed as Nox-Rust Clear-Pak, the treated Mylar plastic protects packaged ferrous metal parts and components from rust and corrosion by releasing an invisible vapor into the atmosphere of the package. Subsequent processing such as soldering, brazing, or plating of the packaged item is not affected by the vapor, the maker states. Available in a variety of roll and pouch sizes, the heat-sealable material may be processed on automatic printing and packaging machines. For more information write: Daubert Chemical Co., Dept. PE, 4700 S. Central Ave., Chicago 38, Ill., or *circle number on card.*

20—Metal Detector

An industrial metal detector has been designed to protect against contamination of products and damage to machinery caused by metal chips and particles. The unit is sensitive to all metals—magnetic and non-magnetic. The degree of sensitivity of the unit is adjustable. The products to be inspected pass through the search-head window either on a conveyor belt or by gravity

A-B-C Short Case Sealer



saves floor space

This A-B-C Short Case Sealer really increases packaging efficiency. Glues, folds and seals either or both top and bottom flaps in one operation—automatically. Speeds up to 30 cases a minute. Finest welded construction. Ball bearing construction reduces maintenance. Guaranteed not to get out of "time".

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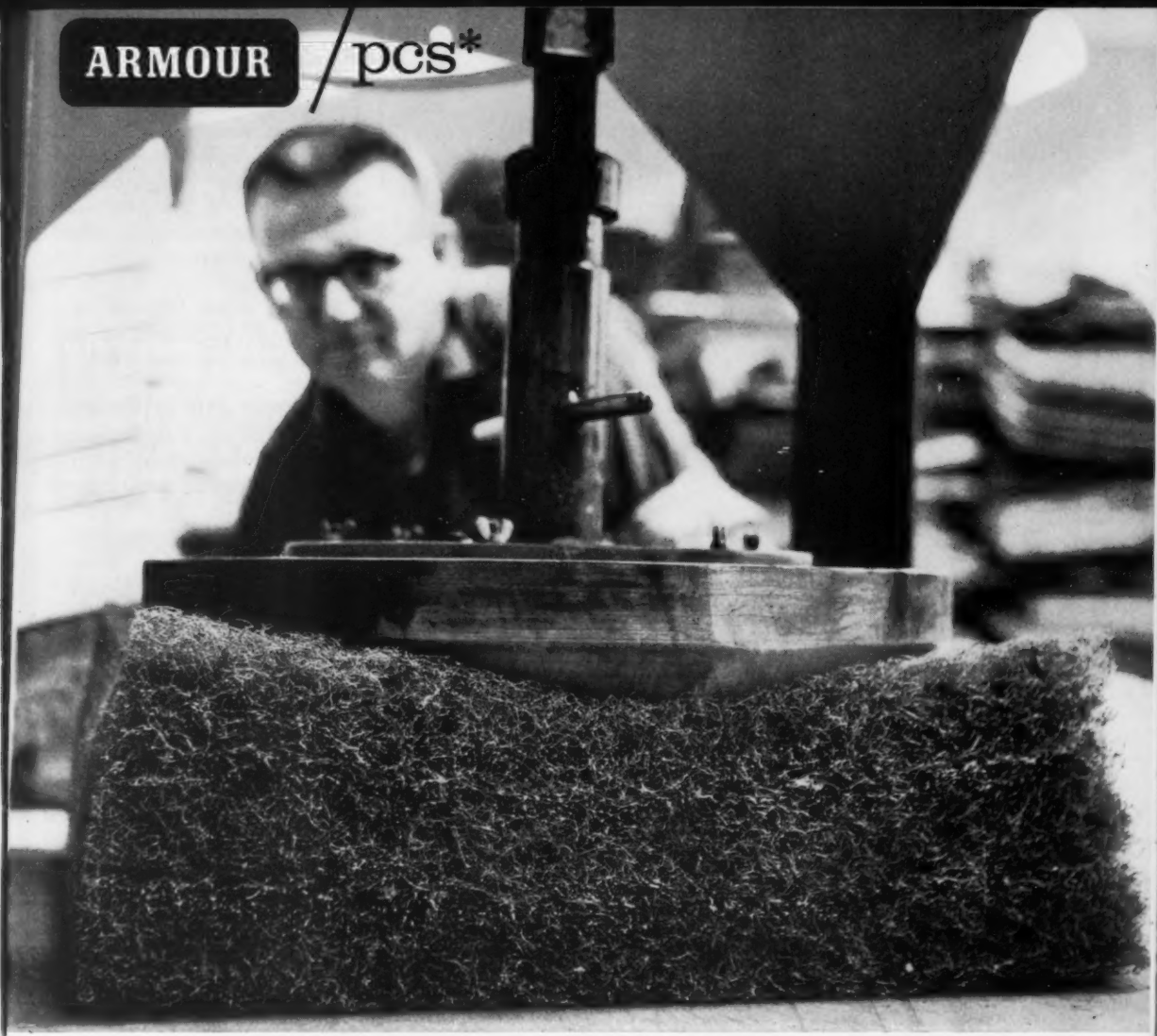
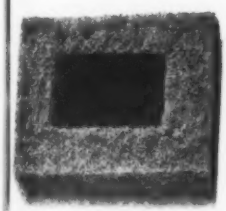


*protective cushioning service studies the bumps to protect your product



Special Hairflex packs can be fabricated to pillow your product.

Calculating the precise characteristics necessary for your product's protective cushioning is a job for Armour/pcs. Armour's expert package engineers are ready to assist you with the technical skills and modern equipment necessary to design and fabricate a protective pack that cuts shipping hazards to the minimum.

As the leader in processing and fabricating Hairflex—the rubberized curled hair for critical packaging applications—Armour/pcs can bring unmatched skill, experience and facilities to bear on your problem.

If you ship a fragile high-value product, Armour/pcs can help you reduce in-transit damage. Take advantage of this comprehensive technical service. For your free copy of our brochure describing Hairflex for packaging applications, write to: Cushioning Products Division, 16123 Armour Street, N.E., Alliance, Ohio, or 2001 Saybrook Avenue, Los Angeles, California.

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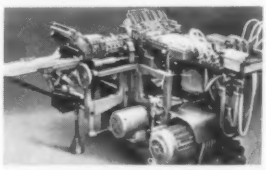
feed. According to the maker, the equipment is unaffected by vibration, temperature, humidity, and line-voltage changes. A number of alarm systems, ejectors, and marking devices are available. For more information write: Instrument Corp. of America, Dept. PE, 516 Glenwood Ave., Baltimore 12, Md., or *circle number on card.*

21—Insert Folding Machine

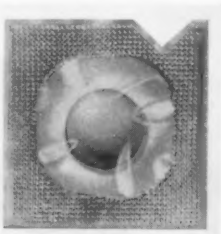
A machine is being manufactured to automatically fold small package inserts. According to



the distributor, the Master Minifolder is capable of turning out hundreds of inserts per min., each one folded as many as eight times to the thumbnail size of 9/16 in. Manufactured by Herzog-Heyman, it is equipped with a single-stream suction hopper feeder which will handle coarse or fine paper stock. Sheet sizes accommodated are from 2x2¾ in. to 8½x11¾ in. For more information write: Super Speed, Inc., Dept. PE, 742 S. Sherman, Chicago 5, Ill., or *circle number on card.*

22—Notch For Opening

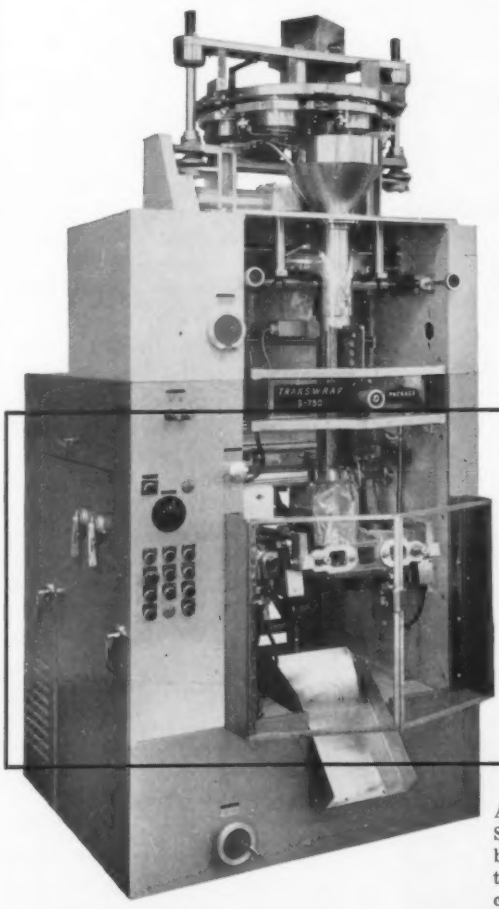
Machinery has been developed for cutting a notch in unit-packs to facilitate opening of the in-



dividual packages. Called the IL See-V notch, it consists of a V-shaped cut-out along the edge

10 BIG REASONS

why the Transwrap S-750 gives you more for your Packaging dollar!



- **Up to 75 bags a minute.** Convenient handwheel regulates speed from 25 to 75 bags per minute.
- **Modern push-button controls.** Centralized controls provide utmost convenience, simplified operation.
- **Wide size range.** Forms bags 3″ to 15″ long, 2″ to 8½″ wide. Bag change-over time reduced to less than 15 minutes.
- **No oiling of drive unit.** Sealed ball and roller bearings in central drive unit require *no lubrication.*
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- **Fully-protected electrical controls.** Dust and waterproof panel houses all electrical controls, makes cleaning easier and faster, reduces maintenance.

EXCLUSIVE FEATURES

- **Completely new modern design.** Styled by Peter Muller-Munk Associates, foremost industrial designers.
- **Fastest drawbar action.** New linear, crank-operated drawbar, spring counterbalanced for longer life, speeds bag forming.
- **New paper feed.** Unique pre-feed roll arrangement eliminates drawbar pull and film stretching.
- **New plug-in end seal assembly.** The only machine to offer fast, easy change-over of sealing mechanism for different types of film.

All-new engineering, performance, and appearance make the Transwrap S-750 the most advanced bag forming, filling, and closing machine you can buy. The S-750 runs polyethylene and all other flexible, heat-sealable materials, is especially adaptable to pouch packaging of frozen vegetables and candy products. Get all the facts on how the Transwrap S-750 will help you increase your profits. Call your PACKAGE Sales Representative today.

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Trapped printing!
Tough package!
Two "See-Thru" Materials Combined:
coating: polyethylene
POLYCEL®
base: cellophane
POLYETHYLENE COATED CELLOPHANE
Polycel is printable, sealable, durable, crackproof. It prevents transmission of moisture, grease, vapors, odors. HPS Polycel has all the advantages of two proved flexible and functional materials, expertly combined to do the best job for converters and users of transparent packaging.
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Originators of Protective Packaging Combinations
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of the package which can not only be easily seen, but also allows the consumer to feel exactly the right place along the edge of the package where it will open best. The notch is being used on unit-packaging materials made from polyethylene, saran, cellophane, etc. Both dry and liquid products may be packaged with the new notch feature including pharmaceuticals and sample unit packages of foods, cosmetics, etc. For more information write: Ivers-Lee Co., Dept. PE, 215 Central Ave., Newark, N.J., or *circle number on card.*

23—Wrapping Film

Introduced recently was Visolyte, a new transparent plastic film for wrapping purposes. Crystal clear and crisp in texture, it may be used for windows on display cartons, as an overwrap for produce, and as a lamination to high-impact polystyrene. Described as a biaxially oriented polystyrene, the film offers excellent machineability and printability, according to the producer. In listing other qualities of the film, the maker states it is easily removed when used as an overwrap, presents no blocking problem, and has superior low-temperature performance. Adaptable for use on most existing equipment, the film is available in a variety of thicknesses from 0.0005 to 0.002 in. and in widths up to 46 in. For more information write: Visking Co., Div. of Union Carbide Corp., Dept. PE, 6733 W. 65th St., Chicago 38, Ill., or *circle number on card.*

24—Blister Pack Marker

The Model 25A blister package marker is a new machine for imprinting entire strips of blister packages at a time at speeds up to 40/min. A wide range of package sizes and shapes may be marked and the use of special Markem inks developed for plastics gives imprints which resist

dirt, moisture, handling, and abrasion, according to the manufacturer. The machine may also be used to mark other flat-surfaced objects with imprints up to 5x11 in. It may be equipped with its own automatic feed and take-away or can be used as a unitized printing head installed in existing production lines. For more information write: Markem Machine Co., Dept. PE, 150 Congress St., Keene 35, N.H., or *circle number on card.*

25—Foil Pan

A new size aluminum foil pan, the SRC-61, has been announced. The pan measures 6-11/16 x 10-11/16 x 7/8 in. and is 9 cu. in. smaller in capacity than the usual size of foil pan used by the baking and food packaging industries, but has almost the same product display area as the larger pan. Two weights of aluminum foil are available: 0.0035 in. and 0.003 in. For more information write: The American Pan Div., The American Tool Works Co., Dept. PE, 720 E. Pearl St., Cincinnati 2, Ohio, or *circle number on card.*

26—Pouch Maker

A horizontal pouch maker, called the Type PFC, is offered with any of three filling methods. Piston, auger, and pocket-type feeds will fill a wide range of powder, granular, and certain paste products. An additional feature is that multiple filling heads can be mounted on the machine to package one, two, or even three different products into a single pouch. The unit automatically forms, fills and seals pouches of heat-sealable foil, cellophane, papers, and laminations at speeds up to 150 pouches/min. For more information write: FMC Packaging Machinery Div., Food Machinery & Chemical Corp., Stokes and Smith Plant, Dept. PE, 4994 Summerdale Ave., Philadelphia 24, Pa., or *circle number on card.*

(End)

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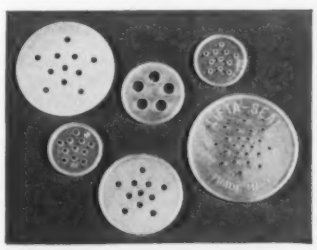
SIFTER TOPS

Easy to apply
Just snap on

Economical
No cap liner needed

Sales-wise
WS Sifter Tops build repeat sales



WS makes plastic caps (custom and standard), tips and fitments, lead and aluminum fold-up tubes.

Ask your WS salesman, or call collect . . . Crestview 7-3000

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For your convenience, we have also included addresses of suppliers so that you may write directly for more information.

101—Tear Tapes

A 16-page booklet demonstrates methods for incorporating convenience opening devices into packages made of flexible or transparent materials. Three different types of tear tapes and applications are presented. For more information write: The Dobeckum Co., Div. of The Dow Chemical Co., Dept. PE, Cleveland 1, Ohio, or *circle number on card.*

102—Plasticizers

A booklet is offered pointing out the advantages and versatility of solid plasticizers. They may be used for adhesives, lacquers, foams, rigid compositions, and films. For more information write: Monsanto Chemical Co., Plasticizer Sales Dept., Organic Chemicals Div., Dept. PE, St. Louis 66, Mo., or *circle number on card.*

103—Carton Sealer

The Concora sealer is a carton sealing machine which uses high-frequency radio waves as a catalyst for activation of cold polyvinyl adhesive which has been applied directly to a waxed carton surface. For more information write: Container Corp. of America, Dept. PE, 38 S. Dearborn, Chicago 3, Ill., or *circle number on card.*

104—Tear Tester

Bulletin 265 describes the Albert torsion tear tester which was developed to measure shear strength or tearing resistance of strongly directional materials. For more information write: Thwing-Albert Instrument Co., Dept. PE, Penn St. and Pulaski Ave., Philadelphia 44, Pa., or *circle number on card.*

105—Boxes/Crates

A pamphlet shows manufacturing facilities and lists types of Superstrong boxes and crates such as, wirebound, wooden, and corrugated boxes; beverage cases; starch trays; and wirebound pallet boxes. For more information write: Rathborne, Hair and Ridgway Box Co., Dept. PE, 1440 W. 21st Pl., Chicago 8, Ill., or *circle number on card.*

106—Extruded Plastic Foam

A printed sample of Dyna-Foam, an extruded low-density expanded polystyrene foam, is being offered. Material may be formed as a film, sheet, lay-flat tubing, pipe, rod, and special shapes. For more information write: Dyna-Foam Corp., Dept. PE, Ellenville, N.Y., or *circle number on card.*

107—Multiwall Tests

Many of the tests available to users of multiwall bags and their components are illustrated and described in a 20-page booklet. For more information write: West Virginia Pulp and Paper Co., Multiwall Bag Div., Dept. PE, 30 Park Ave., New York 17, N.Y., or *circle number on card.*

108—Bagging Machines

A series of letters from users describes advantages of the Bar-Nun net weigher and the Bar-Nun bag feeder, opener, and weigher. This 4-page brochure illustrates range of models available. For more information write: B. F. Gump Co., Dept. PE, 1345 S. Cicero Ave., Chicago 50, Ill., or *circle number on card.*

109—Boil-In-Bag Report

A 22-page booklet reports on the boil-in-bag packaging and cookery movement. Technical areas of basic research and machinery development are presented. For more information write: Reynolds Metals Co., Dept. PE, 6601 W. Broad St., Richmond 18, Va., or *circle number on card.*

110—Hot-Melt Adhesives

Offered is a 16-page booklet describing Thermogrip hot-melt adhesives (supplied in rope-like form on coils) and a variety of applicators. For more information write: United Shoe Machinery Corp., Dept. PE, 140 Federal St., Boston 7, Mass., or *circle number on card.*

111—Plastic Packaging

The All-Pac machine produces a wide variety of shapes and sizes of plastic ampuls, vials, bottles, cans, or special shapes for the packaging of liquids, creams, etc. For more information write: Leedpak Inc., Dept. PE, 24 W. 58th St., N.Y. 19, N.Y., or *circle number on card.*

112—Cushioning Materials

Cushioning materials and reuseable shipping containers used in the protective packaging of fragile products are described in an illustrated brochure. For more information write: Nash-Hammond, Inc., Dept. PE, 10141 E. Rush St., El Monte, Calif., or *circle number on card.*

113—Coated Papers

Information and samples of Polycel and polyethylene-coated papers are available. Brochure discusses automatic packaging with coated papers. For more information write: H. P. Smith Paper Co., Dept. PE, 5011 W. 66th St., Chicago 38, Ill., or *circle number on card.*

114—Bag Closing Machines

Bulletin No. 300 is a 16-page catalog of closing machines for paper and textile bags of all sizes. Data are given on 25 different machine styles and 7 types of sewing heads. For more information write: Union Special Machine Co., Dept. PE, 487 N. Franklin St., Chicago 10, Ill., or *circle number on card.*

115—Plastic Vials, Jars

A brochure illustrates its range of stock plastic vials and jars. The line includes rigid polystyrene and extruded flexible acetate and butyrate containers. For more information write: Celluplastic Corp., Dept. PE, Federal Trust Bldg., 24 Commerce St., Newark 2, N.J., or *circle number on card.*

(Turn page)

DOW

Plastiatrics in packaging

DOW'S CLINICAL APPROACH TO HEALTHY PLASTICS APPLICATION

CONTROLLED SHRINKAGE REDUCES WARPAGE AND INCREASES DIMENSIONAL ACCURACY IN POLYETHYLENE FITMENTS AND LIDS

CLOSURES, FITMENTS AND LIDS OF ALL KINDS CAN BE MADE OF DOW POLYETHYLENE TO COMPLEMENT PRACTICALLY ANY CONTAINER.

Several Dow polyethylenes have shown exceptional ease in controlling shrinkage in fabrication, thereby giving lids with little or no warpage for molded ice cream containers or fitments with close dimensional tolerances.

Polyethylene's long flex-life and high impact resistance over a wide range of temperatures assure maximum product protection through handling and shipping . . . and provide continued tight seals after repeated removal and reclosure in the hands of the consumer.

Moreover, polyethylene is an excellent water vapor barrier and has a low water absorption rate even at direct contact. This assures important dimensional accuracy and stability during long-term aging.

Polyethylene is characterized by quite a pronounced shrinkage during fabrication when compared to other thermoplastic materials. While the high flexibility of polyethylene will counteract some variation in dimension, it cannot be counted on to answer all shrinkage problems. Fabrication shrinkage must be taken into account during part design and mold design and construction. Shrinkage is affected by part design, mold temperature, injection temperature, and injection pressure. Data on the effects of injection pressure (Figure 1) and mold temperature (Figure 2) during molding fabrication were obtained through studies conducted in the laboratories of Dow Plastics Technical Service.

Manufacturers and end users of containers are invited to consult with Dow on container problems. Please contact your nearest Dow Sales Office or write to THE DOW CHEMICAL COMPANY, Midland, Mich., Plastics Sales Dept. 1878DH12.

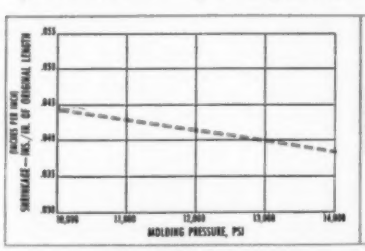

Fig. 1. Effect of Mold Pressure

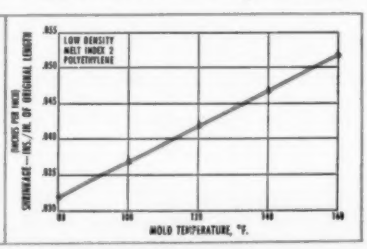

Fig. 2. Effect of Mold Temperature

THE DOW FAMILY OF POLYETHYLENES

410 M Low Density—High Stress Crack Resistant
610 M Low Density
710 M Low Density
910 M Low Density
700 M Low Density
800 M Low Density
901 M Low Density
550 E Intermediate Density
770 M Intermediate Density
771 M Intermediate Density
900 M Intermediate Density
991 M Intermediate Density
1000 M Intermediate Density
1001 M Intermediate Density

NOTE: The formulations ending in 1 denote those formulations which contain a slip additive.

AMERICA'S FIRST FAMILY OF THERMOPLASTICS

STYRON® • ETHOCEL®
TYRIL® • SARAN • PVC RESINS
ZERLON® • POLYETHYLENE
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THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

Mean More For Your Winding Money From HOBBS

Hobbs, one of the foremost builders of web winding equipment in America, has developed a philosophy for efficient, economical winding . . . and this philosophy includes the right winding stand for the winding drive.

In its new winding equipment manual, Hobbs defines the amazing versatility of its 1960 winding stands . . . whatever you wind Hobbs can show you how to get more for your money in winding drives and stands which deliver better winding.

Which Winding Stand Is Best For *Your* Job?

WINDERS • WINDING STANDS • HAND & POWER SHEARS • SLITTERS • AUTOMATIC CUTTERS • DIE PRESSES

Use This Coupon to see a preview of Hobbs winding stands for 1960!

HOBBS MFG. CO., 38L Salisbury Street, Worcester, Massachusetts
Gentlemen:
I would like to preview the Hobbs 1960 winding equipment manual.

Name of Company.....

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HOBBS MANUFACTURING COMPANY
38L Salisbury St., Worcester 5, Mass.
Representatives in Irvington, N. J., Chicago, Cleveland, Greenville, S. C. Louisville, Los Angeles, Toronto and other Principal Cities

591-9

116—Labeling Machine

A brochure provides information on the Model CM continuous motion, fully automatic labeling machine. For more information write: MRM Co., Inc., Dept. PE, 191 Berry St., Brooklyn 11, N.Y., or *circle number on card.*

117—Polypropylene

An illustrated folder outlining the uses and physical properties of Escon polypropylene is offered. For more information write: Enjay Co., Inc., Dept. PE, 15 W. 51st St., New York 19, N.Y., or *circle number on card.*

118—Packaging Abstracts

PACKAGE ENGINEERING magazine is offering a 4-page illustrated brochure describing *Packaging Abstracts*, a monthly publication which abstracts articles about packaging from some 200 magazines from all over the world. Each issue is divided into 18 sections of topics pertaining to raw materials, adhesives, coating treatments, shipping containers, etc. For more information write: Package Engineering, Dept. PE, 185 N. Wabash, Chicago 1, Ill., or *circle number on card.*

119—Metal Drums

A 4-page folder explains how scale-free and rust-inhibited metal drums are manufactured. The folder illustrates the differences between these drums and other painted metal drums. For more information write: United States Steel Products Div., United States Steel Corp., Dept. PE, 30 Rockefeller Plaza, New York 20, N.Y., or *circle number on card.*

120—Molding Compounds

Technical data has been published on Bettle urea molding compounds —urea formaldehyde resin and highly refined alpha cellulose. The 5-page report outlines physical, electrical, and chemical properties. For more information write: American Cyanamid Co., Plastics and Resins Div., Dept. PE, Wallingford, Conn., or *circle number on card.*

121—Taping/Labeling Equipment

Catalog No. 107 describes 58 models of sealing equipment and the Counterboy line of taping and labeling machines. Specifications and prices are included. For more information write: Better Packages, Inc., Dept. PE, 253 Canal St., Shelton, Conn., or *circle number on card.*

122—Temperature Controls

Offered is a 4-page bulletin describing and giving specifications for a variety of differential expansion Thermoswitch controls covering a range of temperatures. Electronic, mechanical, and thermistor indicat-

ing controllers are discussed. For more information write: Fenwal, Inc., Dept. PE, 113 Pleasant St., Ashland, Mass., or *circle number on card.*

123—Silicone Cushioning

Available is a data sheet on its silicone rubber fibrous mat cushioning which, CHR says, possesses qualities superior to those of silicone sponge and foam. For more information write: Connecticut Hard Rubber Co., Dept. PE, 407 East St., New Haven 9, Conn., or *circle number on card.*

124—Counter/Batcher Unit

A bulletin discusses the Model FCB-1 high-speed automatic counter-batcher. Adaptable to small parts, tablets, hardware, etc., the portable machine counts up to 5,000 parts/sec. For more information write: Post Machinery Co., Dept. PE, 140 Elliott St., Beverly, Mass., or *circle number on card.*

125—Case Sealer

An automatic machine which feeds, glues, seals, and discharges cases of various sizes, even when fed in random order, is described in an 8-page brochure, No. 100-60. The Packomatic Omnimatic-Rotopress automatically adjusts to varying case sizes. For more information write: J. L. Ferguson Co., Dept. PE, Box 1226, Joliet 1, Ill., or *circle number on card.*

126—Plastic Containers

A pamphlet illustrates a wide range of stock plastic vials and jars. They are available in rigid polystyrene and extruded flexible acetate and butyrate. For more information write: Celluplastic Corp., Dept. PE, Federal Trust Bldg., 24 Commerce St., Newark 2, N.J., or *circle number on card.*

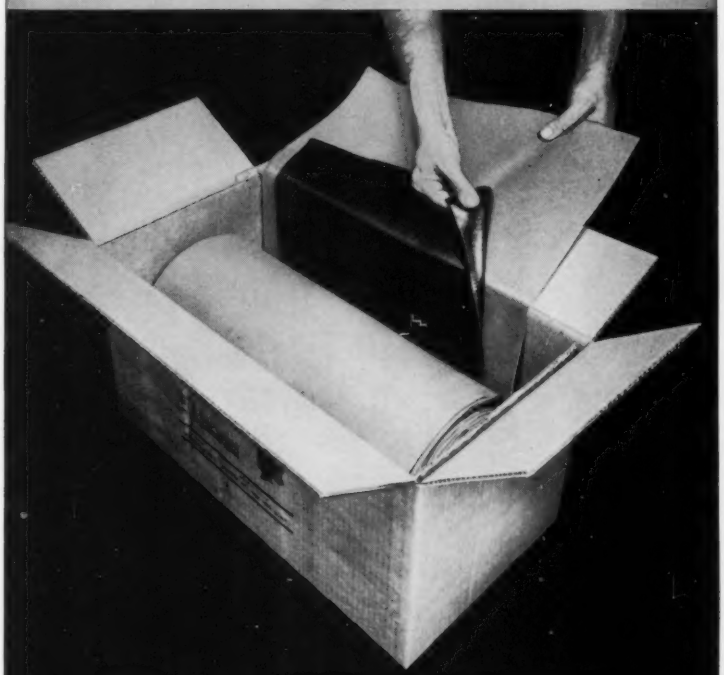
127—Volumetric Fillers

Catalog No. 860F has recently been published to describe an expanded line of volumetric-type liquid filling machines. Particular emphasis is placed on table models including several new developments. For more information write: Popper & Sons, Inc., Dept. PE, 300 Fourth Ave., New York 10, N.Y., or *circle number on card.*

128—Resins/Adhesives/Coatings

A line of resins, adhesives, coatings, polymers, and chemicals is reviewed in a 36-page catalog. Some are: solvent- and emulsion-type adhesives; phenolic and urea and resins; and vinyl, polyvinyl acetate, polyvinyl alcohol, and styrene resins. For more information write: The

2 useful services...



from Patapar® RELEASING PARCHMENT at VULCANIZED RUBBER AND PLASTICS COMPANY

1. To separate calendered rubber from itself and its package, Vulcanized Rubber and Plastics Company, Morrisville, Pa., chose Patapar Releasing Parchment. Handling and shipping has been economically eased for Vulcanized. Storage and preparation is eased for the company's customers.

2. Patapar is stripped from calendered rubber earmarked for company use, cut up, and re-used as interleaving sheets during early processing of rubber for this firm's own products. It can be used this way because it retains its protective and releasing properties.

Perhaps Patapar Releasing Parchment can make *your* production process more efficient. Send for free sample and information kit.

Patapar®
RELEASING PARCHMENT

"Something Special In Papers"

75th ANNIVERSARY
QUALITY PAPERS FOR INDUSTRY SINCE 1885

PATERSON PARCHMENT PAPER CO.
BRISTOL, PENNSYLVANIA
Sales Offices: New York, Chicago • West Coast Plant: Sunnyvale, Cal.

How a Plastic-pipe Maker Solved a Shipping Problem
With Low-Cost J-M Dutch Brand Strapping Tape

* To save space when shipping, plastic pipe must be coiled into rolls of the smallest diameter possible. Such rolls have a tendency to spring-out and uncoil, especially during handling, but J-M Dutch Brand No. 400 Strapping Tape solved this troublesome problem simply . . . and with new dollar-savings!

Scores of glass strands in the vinyl backing of Dutch Brand No. 400 Strapping Tape give it exceptional tensile strength. And it's pressure-sensitive—adheres instantly, holds tenaciously. Thus, one quick wrap of No. 400 at four positions around the roll binds the coiled pipe securely. Rolls can be dropped on a warehouse floor, thrown into truck beds, compressed under weight, subjected to weather changes . . . enduring repeated punishment without releasing or uncoiling. Now binding time takes only seconds without the sharp-edged hazard to pipe products or personnel that often results in slower handling.

There are many ways to build an economical shipping program around Dutch Brand No. 400 Strapping Tape. Write for the J-M Dutch Brand Strapping Tape Booklet. It's filled with ideas, ideas that may help you solve one of your shipping problems.

JOHNS-MANVILLE DUTCH BRAND DIVISION
7800 South Woodlawn Avenue, Chicago 19, Illinois
In Canada—Johns-Manville Co., Ltd., Port Credit, Ontario

JOHNS MANVILLE JM PRODUCTS

JOHNS-MANVILLE

Borden Chemical Co., Dept. PE, 350 Madison Ave., New York 17, N.Y., or *circle number on card.*

129—Label Making Machines

Several leaflets are available on models of flexographic label making machines. Units print and die-cut pressure-sensitive labels in a single operation or print and score-cut gum, heat-sensitive, pressure-sensitive, or plain label stock. For more information write: Sohn Mfg., Inc., Dept. PE, P.O. Box 87, Plymouth, Wis., *or circle number on card.*

130—Static Eliminator

The Curastat is a compact unit for eliminating static-caused production problems. The folder also describes the Staticator, an instrument used for locating static areas. For more information write: Herbert Products Inc., Dept. PE, 180 Linden Ave., Westbury, L.I., N.Y., or *circle number on card.*

131—Release Agent

A kit, complete with engineering reports and a descriptive brochure, has been prepared for Release-Cote, a releasing agent which prevents adhesives from clinging to reservoir tanks and machine surfaces. For more information write: Potdevin Machine Co., Dept. PE, 221 North St., Teterboro, N.J., or *circle number on card.*

132—Uncaser

A full-range, half-depth uncasing machine is described in Bulletin HD-200. Unit automatically uncases all 6- to 32-oz. bottles from 3- and 4-width half-depth cases. For more information write: Atkron, Inc., Dept. PE, P.O. Box 311, Cuyahoga, Falls, Ohio, or *circle number on card.*

133—Vinyl Inks

Bronze and gold gravure inks for printing on vinyl are described and specifications given in Technical Bulletin 512. Samples of printed vinyl are included. For more information write: Claremont Pigment Dispersion Corp., Dept. PE, 39 Powerhouse Rd., Roslyn Heights, L.I., N.Y., or *circle number on card.*

134—Blow Molder

Bulletin 291 describes a dual-manifold blow molder that features continuous high-speed production of rigid and flexible containers in a wide variety of shapes, sizes, and constructions. For more information write: F. J. Stokes Corp., Dept. PE, 5500 Tabor Rd., Philadelphia 20, Pa., or *circle number on card.*

135—Aerosol Packaging

Production facilities are described in a booklet for filling liquid, paste, or powder products into aerosol containers of metal, glass, or plastic with fluorocarbon-type, butane-type, or nitrogen-type propellants. For more information write: Continental Filling Corp., Dept. PE, 123 N. Hazel, Danville, Ill., or *circle number on card.*

136—Corrugated Score

To point up the differences between standard scores and the Hinge-Fold score for corrugated cartons, a series of tests were conducted and the results are reported in a 16-page booklet. For more information write: International Paper Box Machine Co., Dept. PE, 315 Main St., Nashua, N.H., or *circle number on card.*

137—Foil Closure Equipment

A brochure provides information on a line of manual and automatic closure equipment for rigid aluminum foil containers. Three types of machines are described for small-, medium-, and large-volume operations. For more information write: Anaconda Aluminum Co., Dept. PE, 1430 S. 13th St., Louisville 1, Ky., or *circle number on card.*

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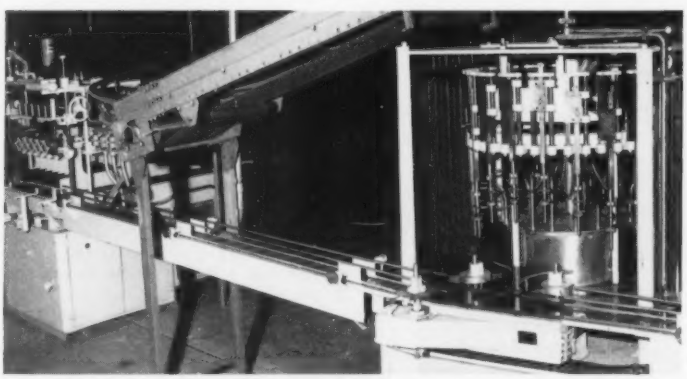
Why Geo. A. Dickel Distillery chose a MACHINERY SERVICE FILLER



This 20 tube Rotary Vacuum Filler was selected for Schenley Distillers' new Tullahoma, Tennessee plant. Teamed up with a Machinery Service Feeder-Cleaner it is considered the best liquid filling machine for its cost because it:

- is more versatile
- can change over quickly to run several bottle sizes inexpensively
- is dependable and easier to maintain—important in a rural location

Whether you are filling liquids in the liquor, food processing, wine, household products or chemical industry, let us show you how an MS filler can lower your packaging cost. Write for descriptive folder.

FILLS BETTER, FASTER!

ECONOMIC MACHINERY CO.

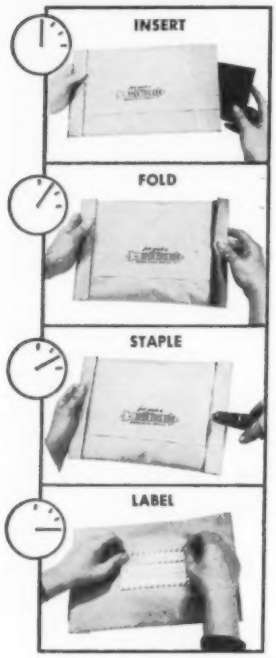
60 FREMONT ST., WORCESTER 3, MASS.

Division of George J. Meyer Manufacturing Company

jet-pak®

CUSHIONED-INSULATED SHIPPING BAG

Shatters Direct Labor Cost



JET-PAK sets new packaging speed record of 15 seconds or less per unit—ready for mailing!

New packaging idea for semi-fragile, small products completely destroys old maxim that inexpensive packaging materials cost more in labor.

JET-PAK costs less than almost any other kind of material—yet, its simplicity and completeness as a package eliminates all waste motion, speeds packaging process, drives down labor costs per unit, costs far less to use than any other kind of material.

Security and protection are complete. JET-PAK cushions and insulates with millions of tiny particles of resilient paper held between double walls of tough, moisture-resistant, asphalt-laminated Kraft paper. Contents are safe from damage, pilferage, rain and abrupt temperature changes.

Drop tested by U. S. Post Office, JET-PAK is approved for mailing purposes. Cheaply imprinted at factory, JET-PAK adds impact to advertising programs. Produced in 14 regular sizes, JET-PAK is flexible and available.

JET-PAK is the newest, speediest, safest, *cheapest* way to package small units.

Prove it to yourself!

Score your present method against jet-pak

MODERN PACKAGING REQUIREMENTS	jet-pak	YOUR METHOD
1 High Security	Approved by U.S. Post Office	
2 Low Material Cost	3¾¢ ea.—10M—No. 3 size	
3 Lowest Labor Cost	Average—15 sec. per unit—ready for mailing	
4 Minimum Waste Motion (supplying materials to bench from storeroom)	One item	
5 Low Cost Imprinting	50¢ per 1,000	
6 Simplified Procurement	1 source	
7 Clean and Attractive	Send for free samples	
Book Mailers of Educational Materials	Free imprint on Jet-Pak Book Bags Save on Postal Rates	

SEND FOR SET OF FREE SAMPLES TODAY!

Clip this advertisement to your letterhead and mail to:

ROPE COLUMBIAN TWINES

jet-pak
Packaging Division
Columbian Rope Company
Auburn, New York

138—Gummed Paper

A new sample book—with removable swatch samples—displays the various grades and colors of Prone gummed paper. Examples of applications and a gummed paper information guide are also included. For more information write: Mid-States Gummed Paper Div., Minnesota Mining & Mfg. Co., Dept. PE, 6850 S. Harlem Ave., Bedford Park, Ill., or *circle number on card.*

139—Weighing System

Combining scales with calculators and other equipment through use of a binary code provides a semi-automatic weighing system for process, quality, and cost control. The basic weight classification system is described in Bulletin 3347-A. For more information write: The Exact Weight Scale Co., Dept. PE, 912 W. Fifth Ave., Columbus 8, Ohio, or *circle number on card.*

140—Bottle Cleaners

A folder presents a flow diagram, specifications, and descriptions of the Model 10 Hydro-Jet bottle cleaners. Various sizes are illustrated and units handle 16 oz. bottles or smaller. For more information write: Barry-Wehmiller Machinery Co., Dept. PE, 4660 W. Florissant Ave., St. Louis 15, Mo., or *circle number on card.*

141—Ink In Aerosol

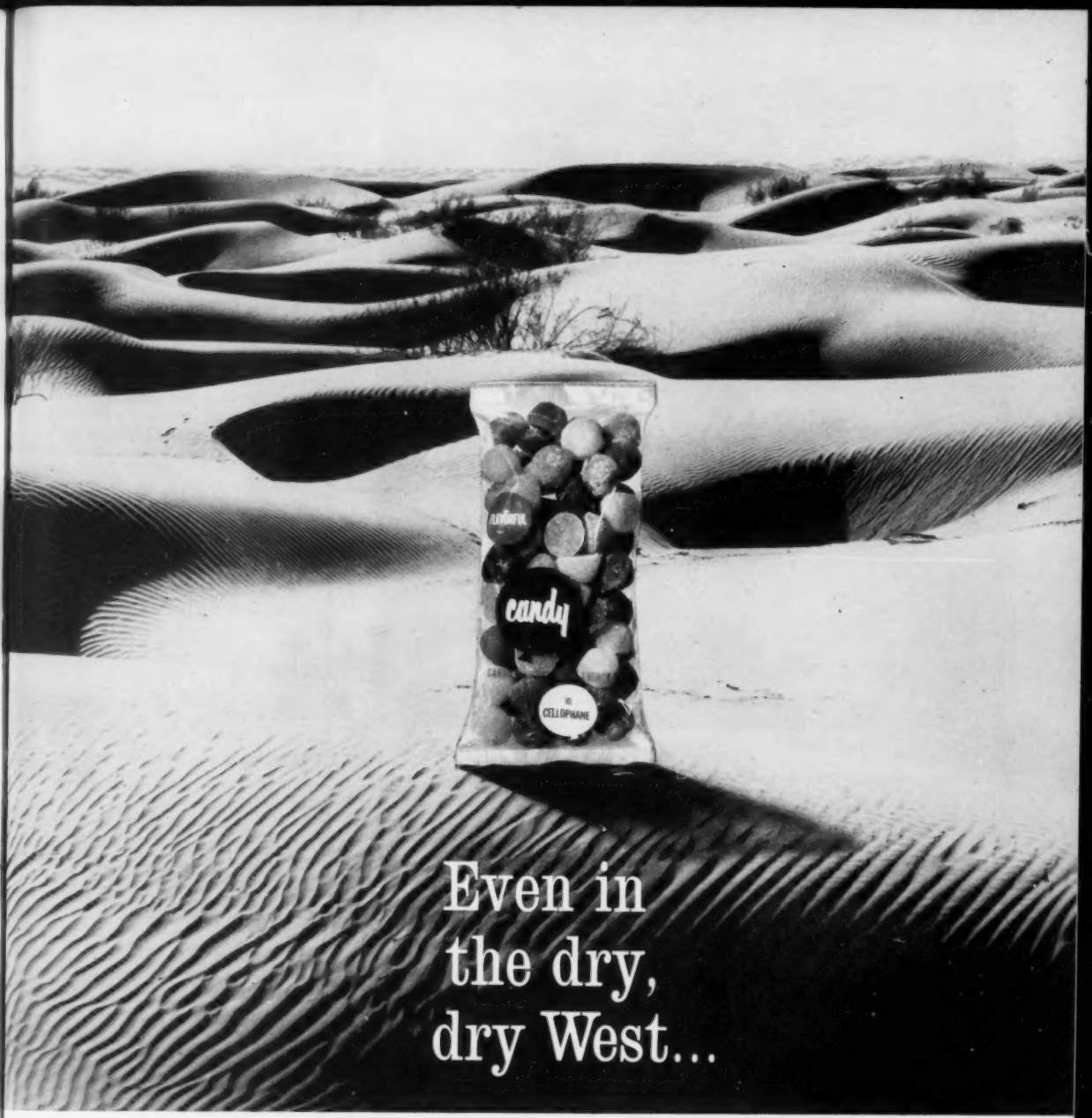
Specially formulated, instant drying, water-proof ink for stenciling corrugated cartons or any metal, paper, concrete, fiber, fabric, or other surface, is described in Bulletin No. 601. For more information write: Reynolds Ink, Inc., Dept. PE, 4536 Euclid Ave., Cleveland 3, Ohio, or *circle number on card.*

142—Dimensional Stabilizer

Three technical bulletins (TP247-39, S1-858, S1-158) are being offered which discuss Stab-U-cel. This chemical has the ability to provide dimensional stability and curl control in uncoated, coated, and laminated papers. For more information write: The Upson Chemical Corp., Dept. PE, Lockport, N.Y., *or circle number on card.*

143—Electric Stapler

A 6-page booklet called "Industry . . . Staples and Saves With Staplex" has been made available. Uses and economies of this automatic electric stapler are illustrated. For more information write: The Staplex Co., Automatic Stapler Div., Dept. PE, 777 Fifth Ave., Brooklyn 32, N.Y., or *circle number on card.* *(Turn page)*



Du Pont "K"* cellophane keeps candy fresh longer

Take the case of the candy manufacturer who distributes his products in 16 western states. Talk about dry—out there the average humidity is 12% to 17%. You can imagine what *could* happen to his candy.

He tested all sorts of packaging materials. But only one was moisture-proof enough to keep his candy from drying out—and also tough enough to take the knocks of shipping and handling. It was Du Pont's new polymer-coated "K" cellophane, Type 600.

But that's not the whole Du Pont cellophane protection story. "K" cellophane, Type 600, is just one of over 100 Du Pont cellophanes with different coatings for special packaging jobs. They're all tops for efficiency on high-speed packaging lines . . . and all give crystal-clear transparency that moves products *fast!*

Need help with a packaging problem? Call a Du Pont Representative. He'll be glad to help you. And ask him for the new booklet, "Properties and Uses of Du Pont Cellophane". It's a handy reference guide that can be useful to you. Or write: Du Pont Film Dept., PE-12, Wilmington, Delaware.

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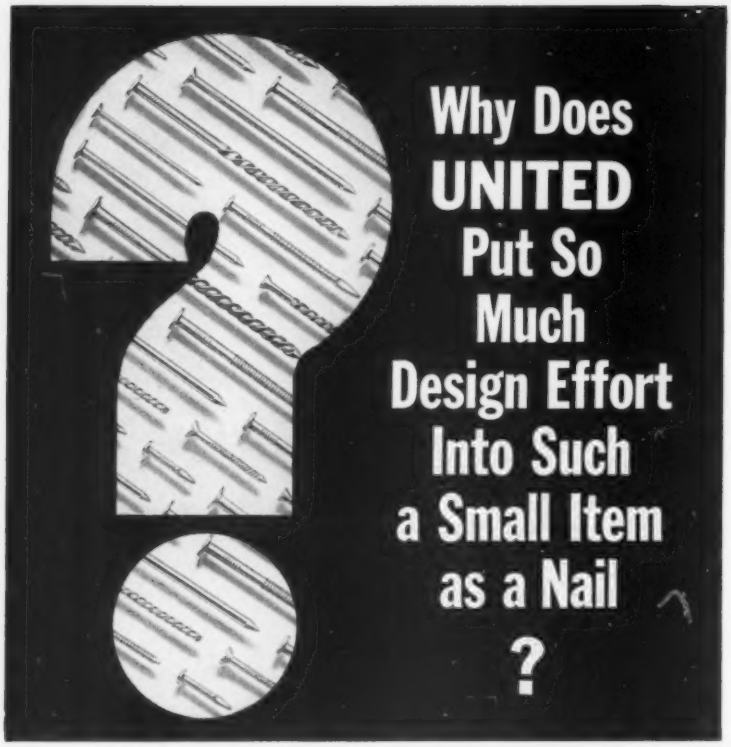
For more information circle No. 259 on Reader Service Card



Annular Thread Action

As nail is driven, sharp, deep, clean, well formed annular threads lock with wood fibers which wedge into deep grooves between thread crests. Holding power can increase as wood seasons. Best for soft and medium woods.

Spiral Thread Action

Spiral thread has sharp crests, deep roots, correct lead angle. Turning as it is driven, nail cuts thread with minimum wood fiber disturbance. Resists tendency to loosen or back out. Best suited for hard woods. Usually in end grain.

Appropriate question. Especially since nails are often considered "just another" way of fastening.

Here's the answer. United designs POWASERT® Machine Quality Nails to do a specific fastening job for a specific job application. Nails include specialty, pallet, common, box and sinker.

POWASERT Machine Quality Nails are designed to run smoothly and efficiently in automatic nailing machines; without jamming and without damaging or marring the surfaces being joined.

What's more, POWASERT Machine Quality Nails provide the head (8 types), the shank (4 types), the point (4 types), the metal (8 types), and the finishes (10 types) to assure the best joint possible in assembled products.

The result of this penchant for nailing performance? Maximum holding power in applications ranging from furniture to sheet steel, from plank roofing to truss plates — with dozens of "woodbe" uses in between.

Why don't you investigate POWASERT Machine Quality Nails for your fastening operations? They are designed for machine operation, and when used in combination with POWASERT Automatic Nailing Equipment, they'll put you dollars and hours ahead.

A United expert in "nailology" will demonstrate new ways you can use nails and automatic nailing equipment now — and in the future. Also, you'll want a copy of the POWASERT Nail brochure. Call or write: United Shoe Machinery Corp., 140 Federal Street, Boston, Mass.

Fastening Advances Automatically Yours With...

United

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144—Bag Maker/Filler

Literature is available on the newly developed twin bag maker and filler which permits production of up to 120 bags/min. with a full range of flexible bag sizes to 8x16 in. For more information write: Triangle Package Machinery Co., Dept. PE, 6631 W. Diversey Ave., Chicago 35, Ill., or *circle number on card.*

145—Contract Research

The first in a series of illustrated statements on contract research for industry has been published and is titled "Procedures of Contract Research for Industry." For more information write: Battelle Memorial Institute, Dept. PE, 505 King Ave., Columbus 1, Ohio, or *circle number on card.*

146—Meat Cans

A pamphlet describes its complete line of open top, oblong, and pear-shaped meat cans and can closing machines. Specifications for 60 can sizes are given. For more information write: Continental Can Co., Dept. PE, 100 E. 42nd St., New York 17, N.Y., or *circle number on card.*

147—Valve Bag Packer

Literature is available on the Black Diamond airflow 2-tube valve bag packer. Unit uses fluidizing principle of conveying free-flowing, dry, granular, and powdered materials. For more information write: Black Products Co., Dept. PE, 13513 Calumet Ave., Chicago 27, Ill., or *circle number on card.*

148—Coagulant Aid

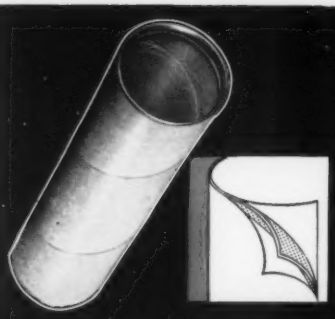
A sample of Wisprofloc-20, coagulant aid No. 68, is being offered. Applications of material are for clarification of process liquids or water treatment through sedimentation, filtration, or flocculation. For more information write: The Permutit Co., Chemical Sales Dept., Dept. PE, 50 W. 44th St., New York 36, N.Y., or *circle number on card.*

149—Corner/Angle Pads

A descriptive folder is offered on Spring-Pak corner and angle pads. A comparison is made between its cushioning properties and corrugated to show strength, applications, and construction. For more information write: Pillow-Pak of New England, Inc., Dept. PE, Pine St. Extension, Nashua, N.H., or *circle number on card.*

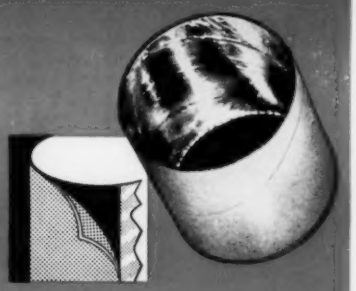
150—Staplers

Brochures are available on different types of stapling equipment. De-



LARDPAK* LINER.
Lardpak liner inside, then fibre, and printed Lardpak paper used outside. A grease barrier for scores of materials. Example of use: caulking compounds.

LARDPAK*, PITCH-BACKED.
This combination offers the packer both grease and moisture resistance. Example of use: various chemicals.

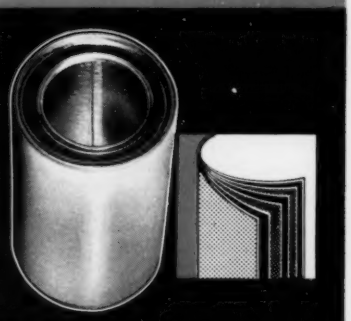


FOIL LINER.
Foil backed by pitch followed by two layers of fibre laminated with glue. Pitch serves two purposes: As adhesive for foil (2) sealer for pin holes in foil. Example of use: seed inoculants.

• There are many sides

to the R. C. FIBRE CAN Packaging Story

• a complete line to fit your packaging needs

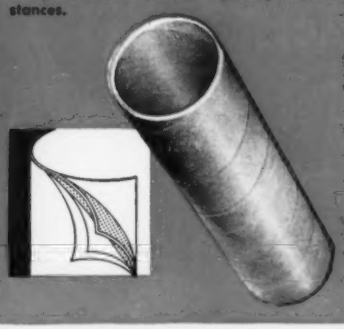


CHIP KB.
Pitch layers between layers of fibre, for moisture resistance. Convolute can shown here. Example of use: wallpaper cleaner, cold water paints.

Have You a Fibre Can Packaging Problem?
Contact your nearest R. C. Sales Office for experienced advice. There's no obligation.

PARAFFIN COATING.
Parrafin lining obtained two ways: spiral wound from coated fibre, or sprayed in convolute can. Example of use: moth crystals, drugs, etc.

LAMINATED KLEERWRAP.*
Lardpak liner inside, followed by fibre, followed by two pieces of glassine laminated together with wax. High grease and moisture resistance. Example of use: caulking compounds and similar "greasy" substances.



FOIL PAPER-BACKED.
Foil backed up by 20 lb. white bond paper, which serves as inside ply of container. Ideal for packaging that requires both moisture and grease resistance. Example of use: ready-to-heat biscuits, and similar food products.

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scriptions and specifications for a bench model end stapler, one-hand clincher, hand boxer, bottom boxer, and air boxer are provided. For more information write: International Staple & Machine Co., Dept. PE, P.O. Box 270, Herrin, Ill., or *circle number on card.*

151—Vacuum Filler

The MS portable vacuum filler and cleaner is described in an illustrated leaflet. The unit is adaptable to short runs and test marketing of any free-flowing and semi-viscous liquid. For more information write: Economic Machinery Co., Machinery Service Div., Dept. PE, 60 Fremont St., Worcester 3, Mass., or *circle number on card.*

152—Electric Counter

Protection against dust, humidity, bacterial growth, and tampering is provided in the hermetically sealed, non-reset electric counter designated CE-41. For more information write: PIC Automation Controls Div., General Controls Co., Dept. PE, 8070J McCormick Blvd., Skokie, Ill., or *circle number on card.*

153—Container Adhesives

Adhesives used in the manufacture of folding cartons; glued lap containers; set-up boxes; and fibre cans, tubes, and drums are outlined in a a booklet, "Paper Container Adhesives." For more information write: H. B. Fuller Co., Dept. PE, 255 Eagle St., St. Paul 2, Minn., or *circle number on card.*

154—Case Packer

The Hydrau-Pak is presented in an information sheet. The end-loading case packer for flat cases and reshipper cases is hydraulically operated and sets up flat cases or positions reshipper cases, loads, and seals. For more information write: General Machinery Corp., Dept. PE, 1831 N. 18th St., Sheboygan, Wis., or *circle number on card.*

155—Vibratory Filler

A brochure is available on the Fillmaster vibratory package filling machine. Several models of semiautomatic and automatic fillers are described. For more information write: Stuyvesant Engineering Corp., Dept. PE, P.O. Box 564, Norwood, N.J., or *circle number on card.*

156—Cloth Tapes

Descriptive literature is offered on Polyken tapes. The tapes feature a cloth backing material with a pressure-sensitive adhesive. Properties are outlined for the No. 110 and No. 113 tapes. For more information write: The Kendall Co., Polyken Div., Dept. PE, 222 W. Adams, Chicago 6, Ill., or *circle number on card.*

157—Thermoplastics

A file folder on Campco thermoplastic sheet and film is available. Reference material is provided on cellulose butyrate and acetate, polyethylene, polypropylene, rubber modified styrene, tripolymer styrene, and decorative finishes. For more information write: Campco Div., Chicago Molded Products Corp., Dept. PE, 2717 N. Normandy Ave., Chicago 35, Ill., or *circle number on card.*

158—Bagging Machine

A catalog sheet describes the Model 015V bagging machine for packaging hardware parts and other multiple small products. Unit handles polyethylene, cellophane, kraft, or other bag materials. For more information write: Tele-Sonic Packaging Corp., Dept. PE, 208 W. 27th St., New York 1, N.Y., or *circle number on card.*

159—Printed Labels

A leaflet which has been printed on a sample of Prone gummed paper stock demonstrates properties of the gummed paper and varieties of labels available for addressing and product identification. For more information write: Kalamazoo Label Co., Dept. PE, 321 W. Ransom St., Kalamazoo, Mich., or *circle number on card.*

160—Transportation Simulators

Transportation simulating equipment, including vibration machines, drop testers, and incline impact testers are described in a 6-page catalog. Brochure contains information on all package testing equipment produced by the company. For more information write: L.A.B. Corp., Dept. PE, P.O. Box 278, Skaneateles 5, N.Y., or *circle number on card.*

161—Polyethylene Films

A 5-page pamphlet describing a complete range of polyethylene film stock sizes, with recommended uses and applications, is being offered. For more information write: The Kordite Co., Div. of National Distillers & Chemical Corp., Dept. PE, Macedon, N.Y., or *circle number on card.*

162—Pressure-Sensitive Tape

A specification sheet on Tapebinder pressure-sensitive tape and dispensers has been published. The 2-page leaflet (No. 710-1300) outlines applications and contains a table of

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physical properties. For more information write: A. J. Gerrard & Co., Dept. PE, 400 E. Touhy Ave., Des Plaines, Ill., or *circle number on card.*

163—Cushioning Pads

A 4-page illustrated folder describes the shock absorbing qualities of Hardi-Pads. The pads are made of polyurethane foam reinforced with a rubber tube to prevent settling. For more information write: Hardigg Industries, Dept. PE, South Hadley Falls, Mass., or *circle number on card.*

164—Drum Handler

A 4-page brochure describes the advantages of the Grip-O-Matic fibre and steel drum handling attachment for fork-lift trucks. Text includes specifications, prices, and how-to-use data. For more information write: Little Giant Products, Inc., Dept. PE, 1658 N. E. Adams St., Peoria, Ill., or *circle number on card.*

165—Weighing Systems

Unitized check-weighing systems are the subject of Bulletin 50. The literature covers the various types of manual and automatic systems which can be assembled from a variety of platform scales, readout equipment, and control instrumentation. For more information write: Weighing & Controls, Inc., Dept. PE, Hatboro 835, Pa., or *circle number on card.*

166—Tension Winding

In an information sheet (AW-2-59-2M), a standard and synchronized model of the Hobbs-Alquist controlled tension winders are discussed. Typical applications are listed. For more information write: Hobbs Mfg. Co., Dept. PE, 41J Salisbury St., Worcester 5, Mass., or *circle number on card.*

167—Wirebound Boxes

Two pamphlets provide descriptive information and illustrations on the various uses and construction of wirebound boxes and crates for packing and handling heavy loads. For more information write: Wirebound Box Manufacturers Association, Dept. PE, 222 W. Adams St., Chicago 6, Ill., or *circle number on card.*

168—Cushioned Bags

Cushioned shipping bags in a range of sizes are described in several pieces of literature being offered. Features of the Zip-Pak bags include a zip string for opening and a single-flap closure with latex adhesive. For more information write: Henry B. Katz Industries, Inc., Zip-Pak Div., Dept. PE, 857-879 Summer Ave., Newark 4, N.J., or *circle number on card.*

169—Impact Registers

A brochure is available which furnishes information on various types of impact registers, ride recorders, flight recorders, and recording accelerometers. For more information write: Impact Register Co., Dept. PE, P.O. Box 445, Champaign, Ill., or *circle number on card.*

170—Molded Polystyrene

An illustrated brochure (No. 2-660) covers the advantages of expandable polystyrene for molding into a variety of shapes for numerous applications. For more information write: Weber Plastics, Inc., Dept. PE, Stevens Point, Wis., or *circle number on card.*

171—Unit-Load Containers

Announced is the publication of a brochure dealing with bin boxes. Design considerations, material requirements, types, and features of unit-load wooden containers are discussed and illustrated. For more information write: National Wooden Box Association, Dept. PE, 402 Barr Bldg., Washington 6, D. C., or *circle number on card.*

172—Weighing Equipment

Two leaflets illustrate and describe the NT weigher, an automatic rotary net weigher, and the Wrightronic checkweigher which electronically gross weighs each package. For more information write: Wright Machinery Co., Div. of Sperry Rand Corp., Dept. PE, Calvin & Holloway Sts., Durham, N. C., or *circle number on card.*

173—Bottling Machinery

A line of equipment for liquid bottling is presented in a brochure. Machinery discussed includes uncasers, sorting tables, unscrambling tables, and flow-control units. For more information write: The Lodge & Shipley Co., Climax Products Div., Dept. PE, 3055 Colerain Ave., Cincinnati 25, Ohio, or *circle number on card.*

174—Taping Applications

An illustrated review of pressure-sensitive tape applications has been introduced. The manual (P-GGA-MR2) shows equipment designed for manual, semiautomatic, and automatic taping. For more information write: Minnesota Mining & Mfg. Co., Dept. PE, 900 Bush Ave., St. Paul 6, Minn., or *circle number on card.* *(End)*

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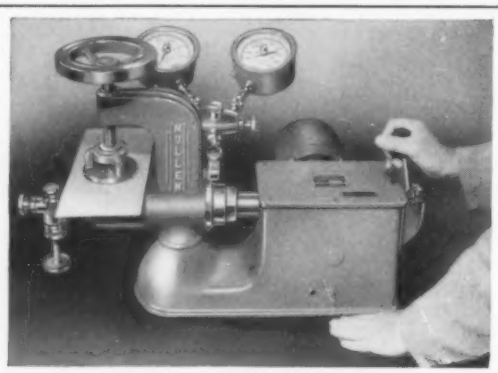

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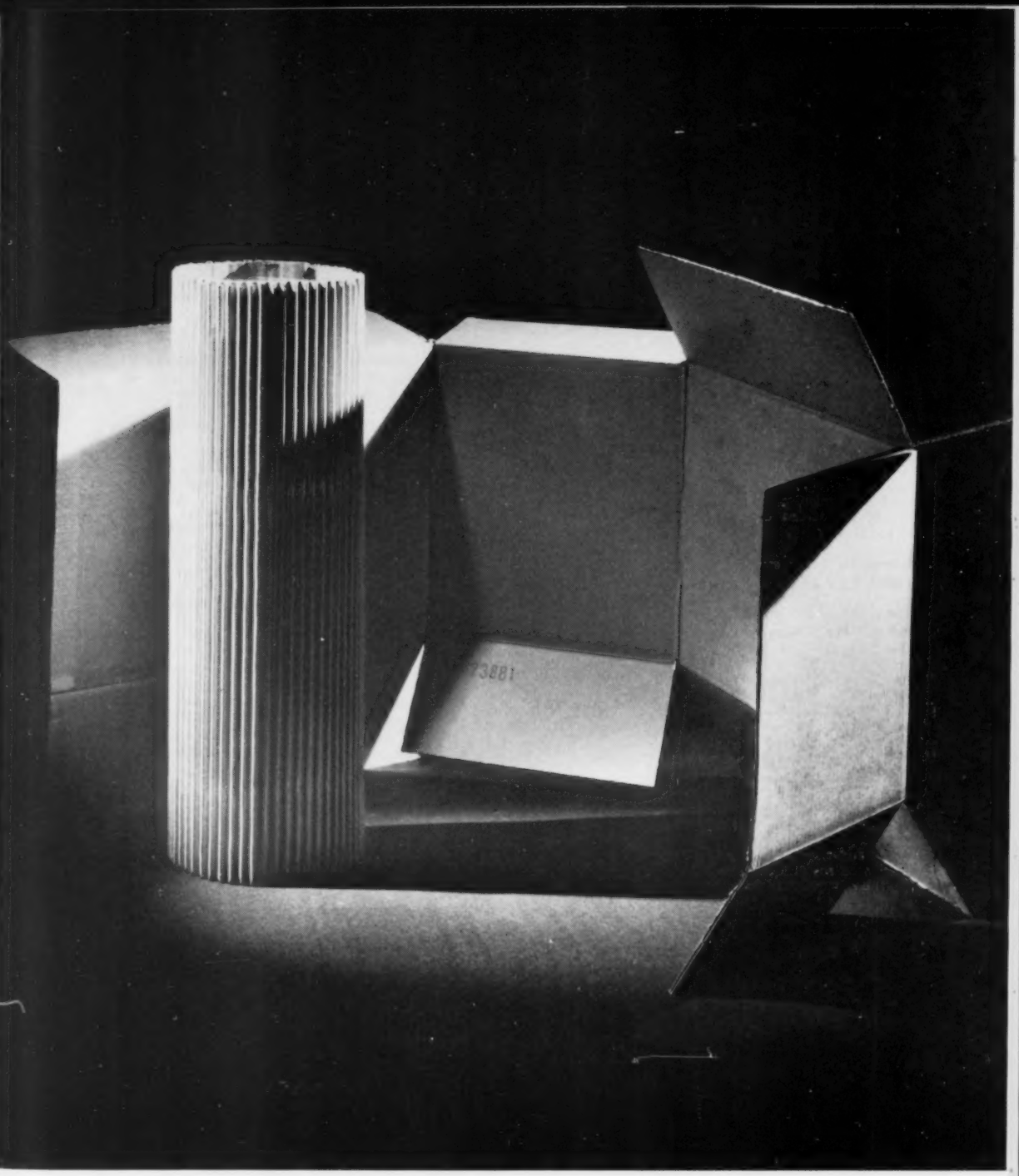
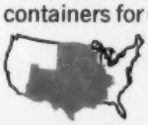


A BOX IS A BOX UNLESS YOU BUILD OR BUY THEM

Then it assumes new meaning. If you build them, terms like finger jig, fluffing, splicing on the fly, kiss impression, and dancing roll become meaningful. If you buy them, compression, impact, drum, drop, and tumbling tests are important criteria. But to consumers, a box is a box. Your customers are only aware of the products they buy being intact, and undamaged, and scratch-free. For 39 years Hoerner has been conscientiously designing, and manufacturing corrugated containers for companies who like satisfied customers.



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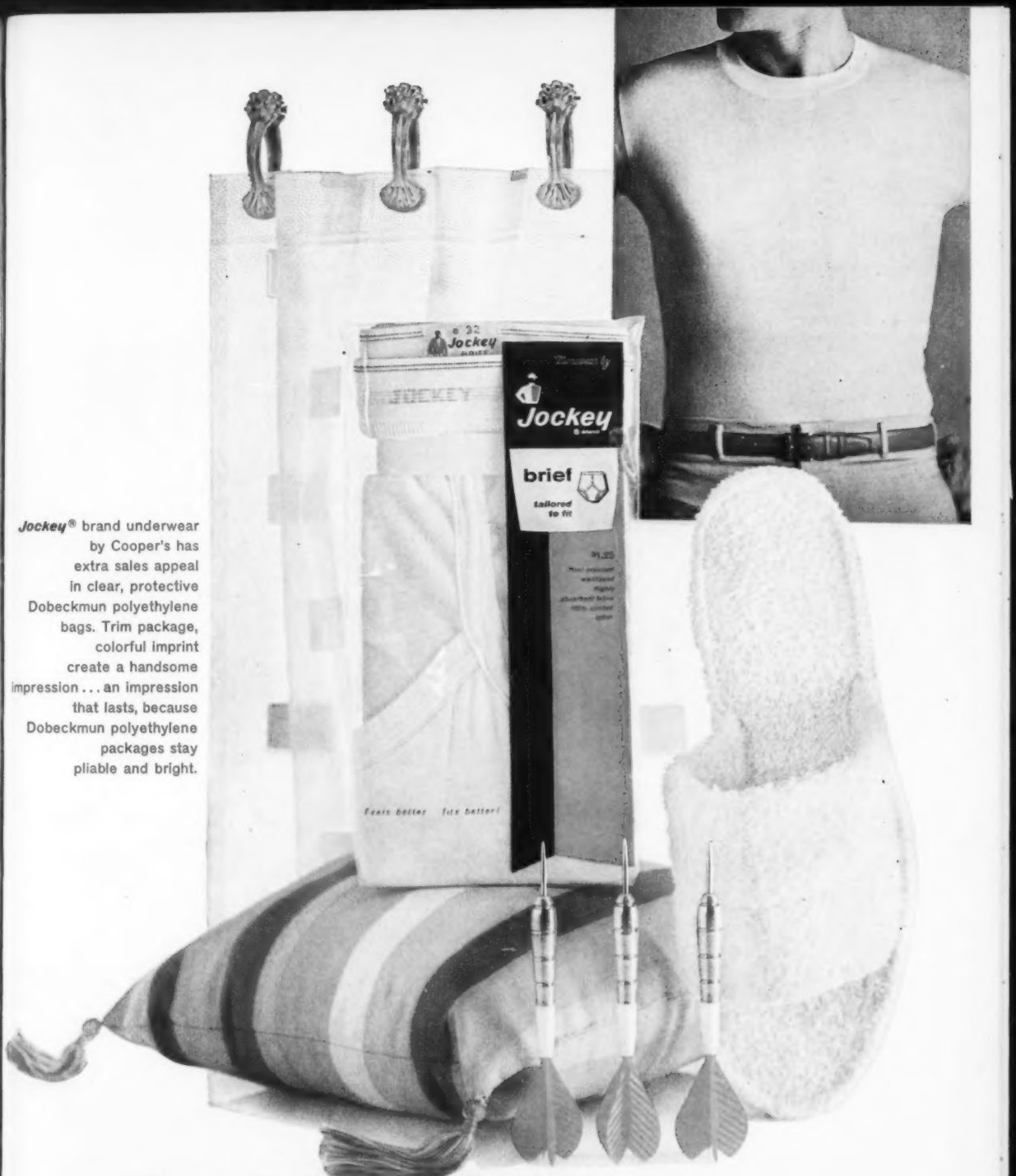

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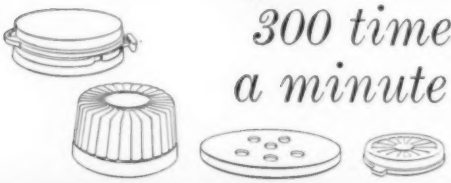

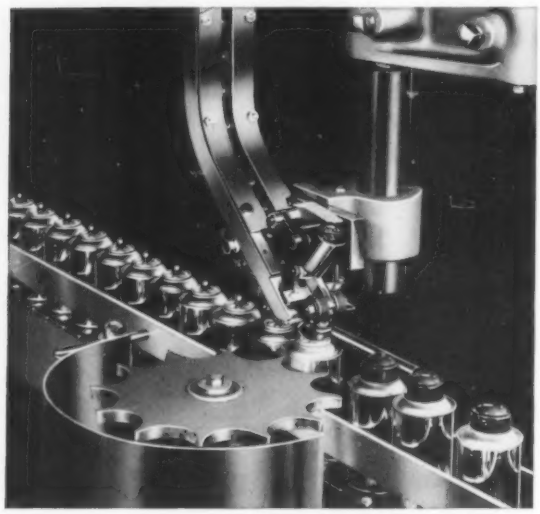

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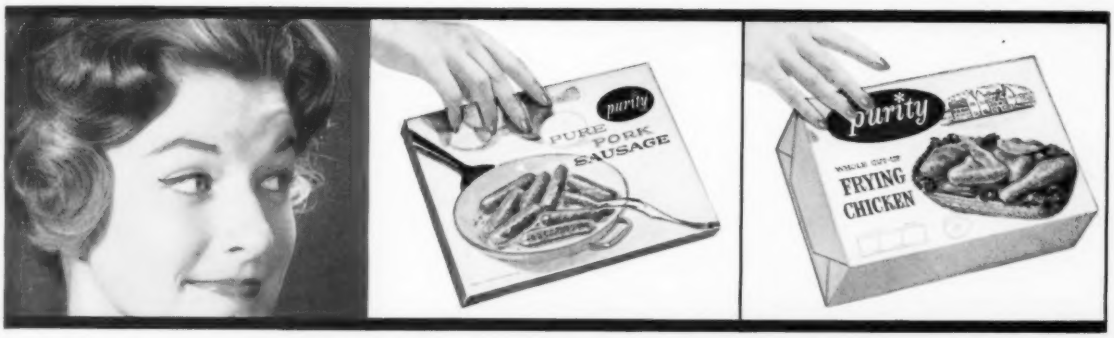

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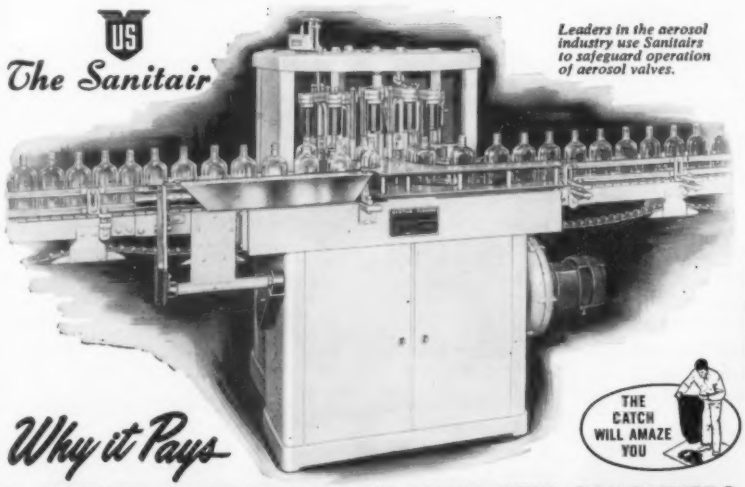

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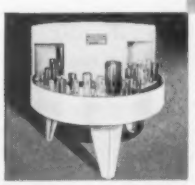

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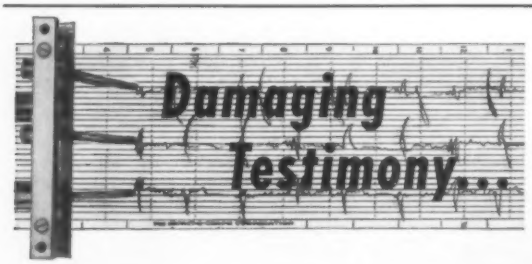

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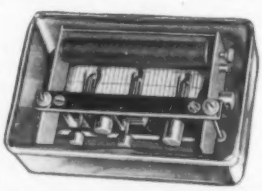

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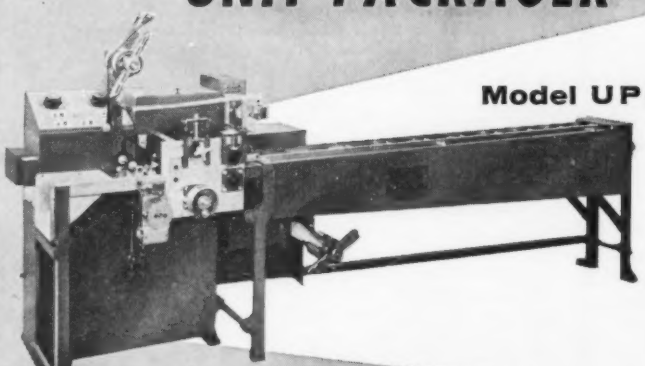

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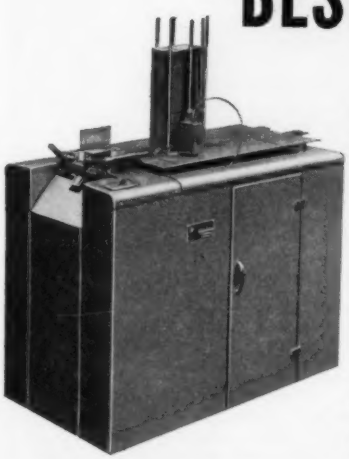

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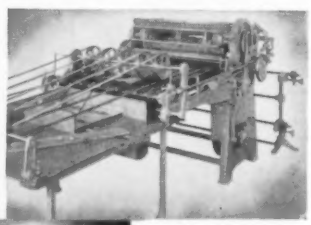

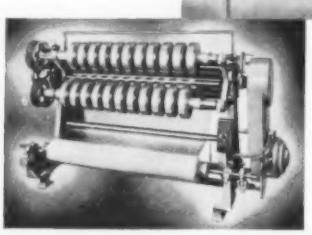

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We recently were appointed American agents for *Packaging Abstracts*, published by the British research association PATRA—The Printing, Packaging & Allied Trades Research Association. This service gives you, in a single, handy periodical (published monthly, plus an annual index), brief summaries of packaging articles that have appeared in some 200 packaging magazines plus over 150 magazines devoted to printing and allied subjects, and numerous patents, books, pamphlets, and technical data provided by makers of machinery and materials.

This publication is unlike any other abstracting service in the world. It covers technical and operational packaging; it abstracts not only English language periodicals, but translates and abstracts foreign language publications from Germany, Russia, France, and every country in the world that publishes periodicals concerned in whole, or in part, with the various phases of packaging.

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Choose right package for fresh fruit

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Single department proves its worth

(Continued from Page 46)

Working Details

Packaging and bottling supplies used in the fill and finish department are recorded on perpetual inventory cards held in the production control department. The production control department has the responsibility of maintaining adequate supplies. As I mentioned earlier, in many companies the fill and finish function is an orphan, but this is not now true of Corn States Laboratories. The basic table of organization of our company shows the relationship of the fill and finish department to the company structure. (See Fig. 2) You will also note the areas from which the members of our packaging committee originate. This is not the complete table of organization, but only enough to show the relation of the fill and finish department to the rest of the company.

In the two years since the department has been in operation, we have developed new methods of operation, a method of label control, a program of quality control of outgoing product, a system of scheduling our work load, and many other changes which we believe improve our company operations. There are some disadvantages in that the production departments must schedule more accurately and surplus labor can no longer be used for minor finishing operations.

Department A Success

The biggest advantage of the new department, however, is that we have been able to develop specialists for filling and finishing operations, and the production departments can train their technicians to become specialists in their areas. Since we set up the new department, we have eliminated some operations and reduced the number of man-hours used in performing others.

The creation of a centralized fill and finish department, along with providing the company with specialized operators, has likewise given the company one man, the department head, whose primary job is packaging. This department head, in conjunction with the packaging committee and methods committee, can review and improve packaging by new package design and the establishment of better methods.

In summary, the centralization of filling and finishing has made it possible to adopt better methods, justify improved equipment, and give more attention to package design—all of which has helped us reduce the cost of production and upgrade our packaging quality.

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What we think

PI's plan to "go all pro" needs continuing support

Packaging Institute's leaders did not mince words in outlining the destiny of the group as a professional society. Speaking during the recent annual forum, various PI officers made it abundantly clear that PI's future lies in the growth of its individual, professional membership.

We think these leaders have correctly evaluated the need of a professional society as such within the packaging field. We commend them for recognizing the opportunity for Packaging Institute to move in this direction.

At the same time, we know that key people in PI have long been eyeing the successes of comparable groups in other fields. The announcement of PI's "going professional" is not a sudden flash of inspiration but rather the result of much contemplation.

Corporate members: stick with the ship

Although PI's treasury is in reasonably good shape, it will not see the group through a protracted period of building up individual membership alone—there is a big difference between individual and corporate dues. This is the immediate problem PI faces in making the switch to a primarily individual membership base.

This means that while PI in effect told the corporate members, "Boys, we're not going to need you from now on," it did not mean it wanted to or could do without corporate members between now and the time it becomes a full-blown professional society. We hope corporate members do not misconstrue PI's statements.

Fortunately, the "official representatives" of the corporate members are people of judgment and ability—and a good many of them contribute a lot of their own time to PI activities. We hope they have no trouble interpreting to others in their company the need of *maintaining* corporate membership in a group committed to becoming an individual-member professional society.

It disturbed us to pick up bits of conversation here and there suggesting that (perhaps simply to save money) some companies might drop their corporate memberships and take out professional memberships for their people. We hope this was largely idle chatter, and the only reason we dignify the conversation to the extent of repeating it here is so that we can recognize the danger and argue against it.

Therefore, we hope official representatives and others who make the decisions about their companies being or not being corporate members are not tempted to drop corporate membership. It may be a challenge for them to urge retention of membership after being told the group is moving toward individual membership. But also, it challenges them to help underwrite and support PI's transition to a professional society.

Over the years things have not been easy for PI. Even now its membership is but a fraction of the field. Considering that this magazine alone has 35,000 readers, and considering that comparable professional groups in other fields have memberships running in the thousands, PI's 700-odd individual members do not ring up an impressive total.

But when you look at the stature and qualifications of the people who *are* in PI and when you consider the number of large, national corporations who do participate, PI obviously is quite a factor in the packaging field.

Big future for national, professional group

Since PI has already recognized the importance of "going national" (in reaching out to hold programs all over the country) and since PI has now taken up the challenge of "going professional," the future is indeed bright. We think its present small but enthusiastic and collectively competent membership will rise to new heights of accomplishment in developing PI into a national, professional group of individual members.

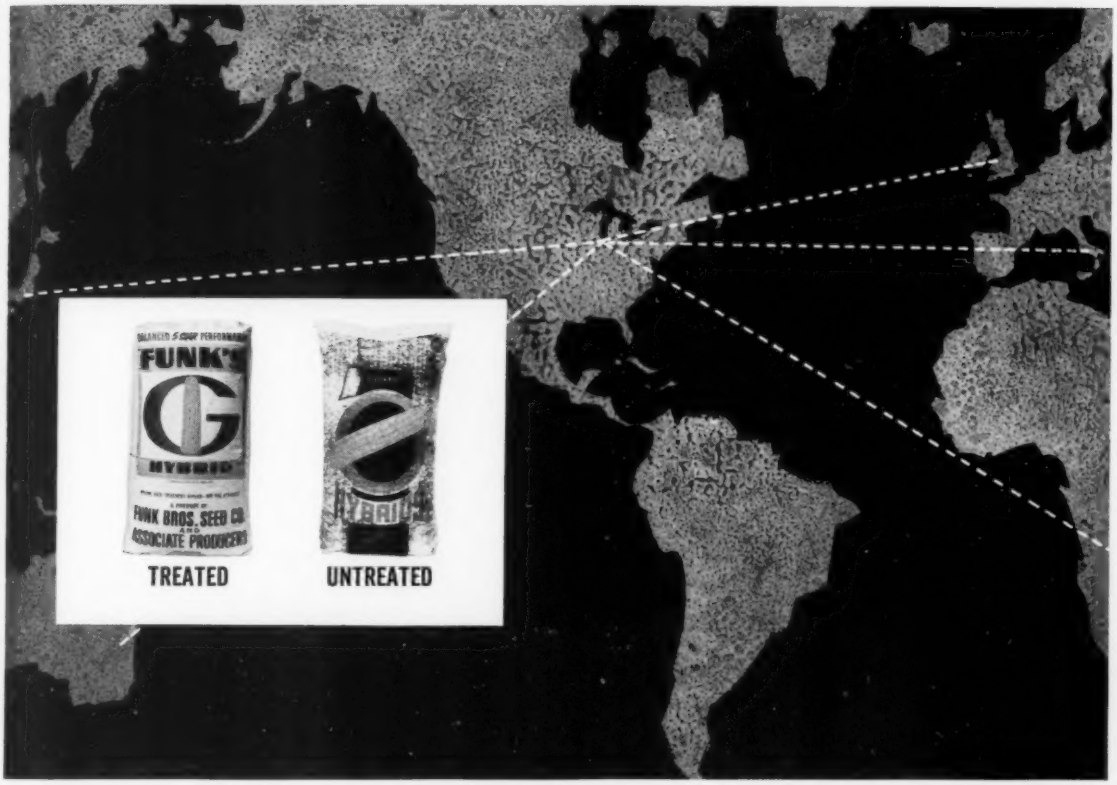
But in the meantime, the corporate members, with their power to continue or not continue membership, hold the key to whether PI grows and develops or does not grow or develop. We hope they sustain PI to the fullest.

Bruce Hoffman

Editor

3M COMPANY CHEMICALS

THE RAW MATERIALS OF PROGRESS



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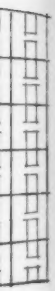
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